

CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

OCTOBER 1, 1992
VOLUME SIX NUMBER ONE
SEVEN DOLLARS

COVER STORY:

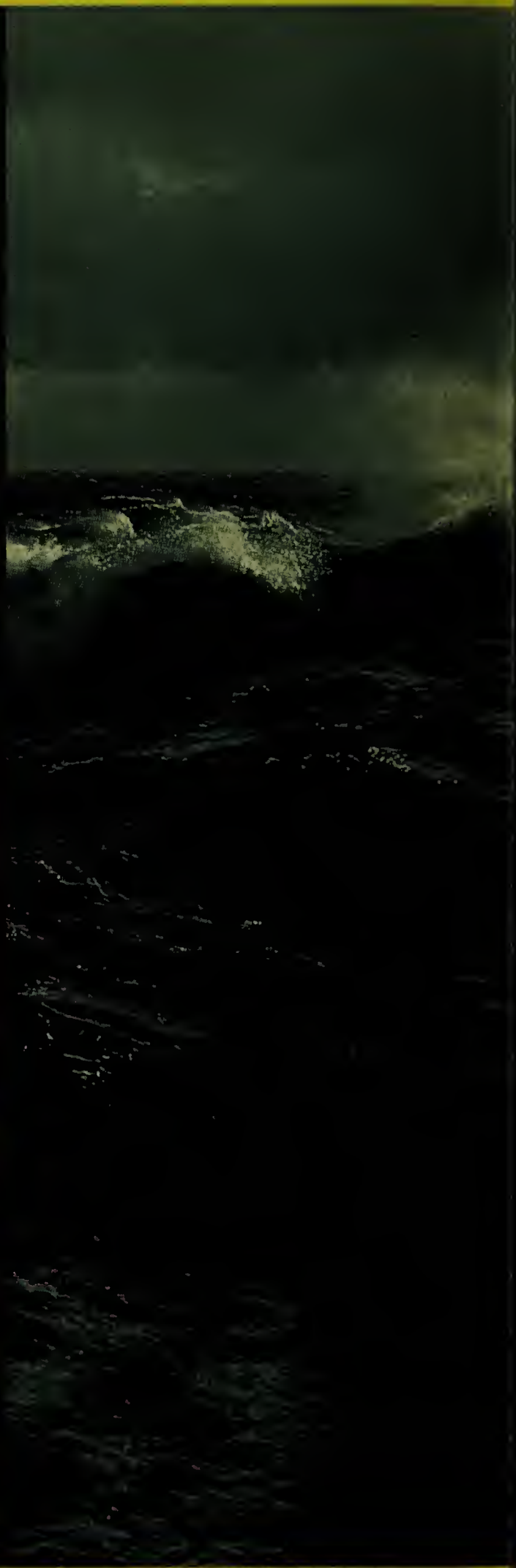
TV's Hot Retail Channels

ALSO INSIDE:
Shrinking
The Risks
Of Downsizing

The Home Shopping
Network's Stella L. Tavilla

AN INTERNATIONAL DATA GROUP PUBLICATION

DIGITAL OPENS NEW FIELDS FOR JOHN DEERE



D I G I T A L . T H E O P



ENGINE WORKS EXPANDS IN OVERSEAS MARKETS

"For over 150 years, the John Deere name has stood for the world's highest quality farm equipment. When Engine Works looked for new growth areas to offset the U.S. farm recession of the 80's, we focused on component

gathering and sharing information from the shop floor to engine testing facilities to all parts of the corporate network. All of which makes it easier and quicker for our people to make critical business decisions that ensure product quality. Likewise, the ability to automate factory-floor functions gives us greater control over product tracking and inventory control.

"And with Digital's COHESION™ software development environment, we can create customized applications faster and at a lower cost than ever before.

"Combine all that with Digital's flexible support and service programs for whatever vendor's equipment we have, and it's easy to see how Digital helps us make good on the promise that 'Nothing runs like a Deere.' "

sales and new markets, both domestic and overseas. For example, we recently started producing a marinized diesel engine for use in workboats and fishing vessels. Digital has played a major role, helping us maintain our quality level while expanding our markets.

"Digital's expandable line of VAX® computers were a natural choice for growth. And, with their networking expertise and their Network Application Support (NAS) open software, we had the key elements for

For more information on how Digital's total solutions approach to manufacturing and our NAS open computing products can benefit your business, call 1-800-DEC-INFO, ext. 92. Or contact your local Digital sales office.

digital™

© DIGITAL EQUIPMENT CORPORATION 1992. THE DIGITAL LOGO AND COHESION ARE TRADEMARKS AND VAX IS A REGISTERED TRADEMARK OF DIGITAL EQUIPMENT CORPORATION.

E N A D V A N T A G E.



*Mike Tatelman
Director, CLASS
Comdisco, Inc.*

**“Today’s small high-tech assets are highly prolific,
but you can keep them under control.”**

“We’re in the midst of an information technology explosion. And at its very heart are the PCs, printers, workstations and other smaller high-tech assets that empower the individual at the desktop. In most companies, these assets are today’s single most prolific species. And proliferating right alongside are the myriad problems associated with tracking and controlling them.

“At Comdisco, we offer innovative solutions to these problems. Including our consulting services, which help you analyze and improve your technology management capabilities. Our integrated asset management software tool called CLASS, which lets you order, track and manage your high-tech assets electronically. Our Global Master Lease, which helps you control worldwide equipment costs and usage. Our business continuity services, which help protect your technology investment. And many others.

“If you want better control of all your high-tech assets—including how much they’re costing you—talk to Comdisco. I think you’ll find us to be a prolific source of proven solutions.”

Comdisco is one of the world’s largest providers of solutions that help businesses acquire, manage and protect their high-tech assets. Our strength is people like Mike Tatelman...people who know your problems and how to solve them. Let us show you how to improve your asset management capabilities by leaps and bounds.

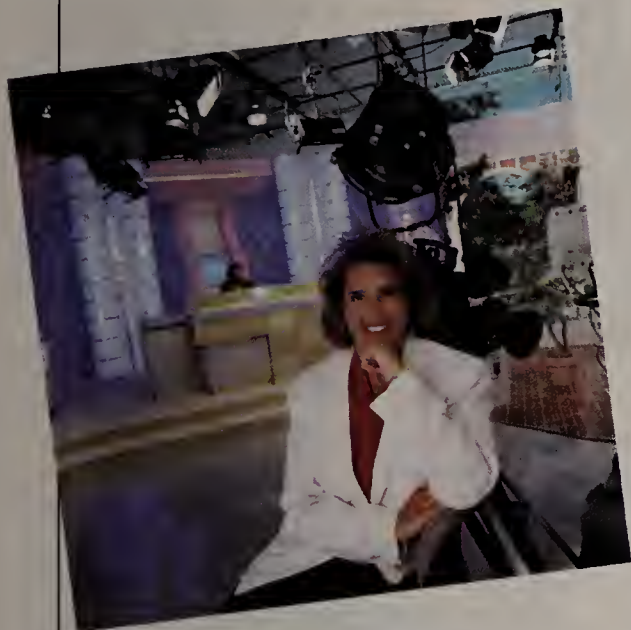
FOR A FREE INFORMATION PACKET CALL 800-321-1111, EXT. 4530.



HIGH-TECH ASSET MANAGEMENT SOLUTIONS

CIO

VOLUME 6, NUMBER 1



Show and sell 38
Cover photo by Kent Hanson

COVER STORY

TV's Perfect Pitch

The action on cable's *Home Shopping Club* is fast and furious as hosts pitch and ditch products based on exhaustive real-time sales information.

By Meghan O'Leary

38

FEATURES

The Power of Positive Shrinking

The decision to downsize is anything but clear-cut. Done correctly, downsizing can pay off handsomely, but an ill-considered effort may spell disaster. The stakes are high and the clock is ticking....

By Richard Pastore

30



Thinking small 30

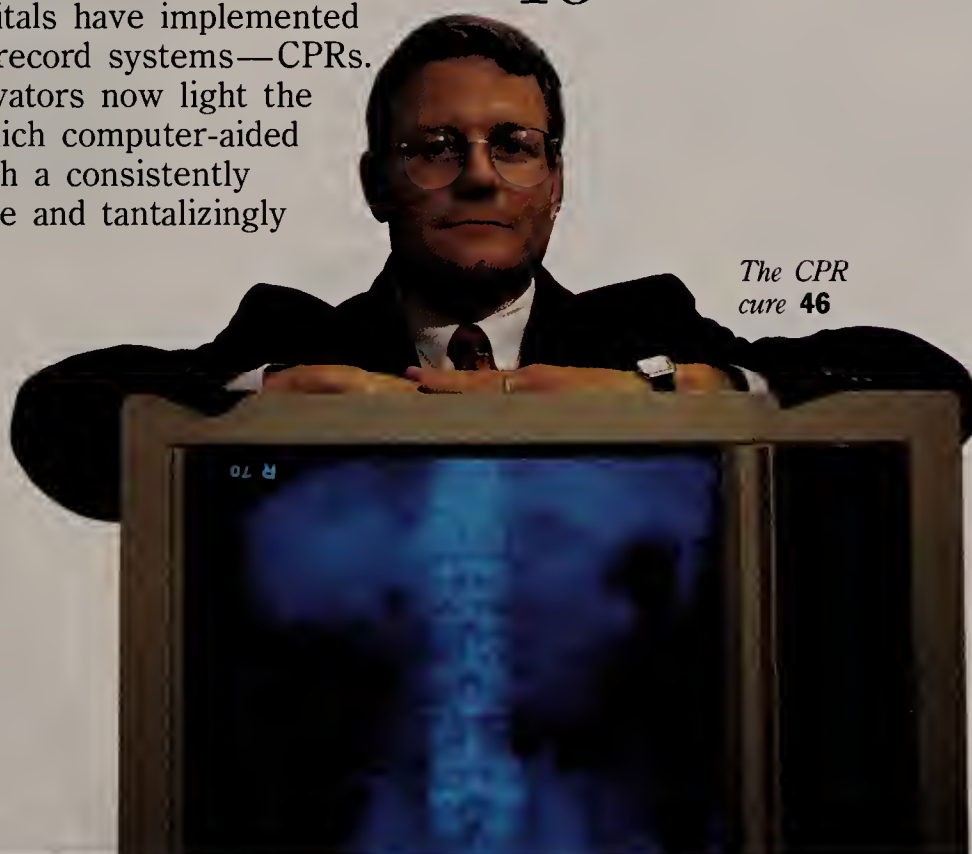
Teaching CPR to Health Professionals

Surprisingly few hospitals have implemented computerized patient record systems—CPRs. But a handful of innovators now light the way to a future in which computer-aided medicine achieves both a consistently higher standard of care and tantalizingly lower costs.

By Allan E. Alter

46

The CPR cure 46



MORE ►►►

BUSINESS

INTER COMPE INTENSIF

One by one, world trade is falling, leading to the rise of a truly global marketplace.

Aided by the substantial breakthroughs in telecommunications and computer technology, many firms are finding it easier than ever to enter markets around the world that were previously unreachable.

Even the smallest firms are now able to compete on a global basis, and are finding that overseas markets offer greater growth potential than domestic markets, which may be flat or saturated.

However, this advent of increased global competition has had a brutal impact on price margins.

Local firms which had previously been protected by tariffs or government subsidies are now finding themselves pressed to compete with the new breed of global competitors, who take advantage of economies of scale to offer products of quality at lower prices.

This new global marketplace has created the demand for multi-currency financial software that can consolidate a firm's global financial picture into one integrated balance sheet or P&L in seconds.

Due to very confusing, complex and ever-changing tax structures and foreign currency exchange rates that vary country-by-country—this is a new challenge to the new breed of CFOs. ■

PRESSURE HEATS UP ON FINANCIAL FORECASTING

The ability to accurately forecast both financial trends in the marketplace as well as the financial performance of the firm is becoming critically important in today's fast-moving, highly competitive marketplace.

With the introduction of new multi-dimensional modeling and financial analysis software, the quality of financial forecasting has risen substantially over the past few years.

New spreadsheet technology such as CA-Compete!, which allows the creation of a multi-dimensional cube of data as

from a
has
dec
fram
to ju.

TIMES LIKE THESE CALL FOR THE FINANCIAL SOFTWARE OF THE FUTURE.

How else will you compete in a world that gets more competitive, more complicated and more technology-driven every day?

New CA-Masterpiece® 3.0 is designed for such a world. It's got EDI. GUI. Client-server. Multi-dimensional modeling. Multinational and multi-currency support. And the industry's broadest selection of high-performance modules and add-ons.

CA-Masterpiece 3.0 is a generation ahead of the financial software you're probably using today, and it runs everywhere: UNIX, VAX, AS/400, DOS and Windows. From mainframes to workstations to PCs.

Best of all, it's backed by CA, the world's leading software company, and software partner to 95% of the Fortune 500.

So dial 1-800 CALL CAI for a free Demo Disk of the financial software of the future.

There's never been a better time.

NEW CA-MASTERPIECE 3.0.

**COMPUTER
ASSOCIATES**
Software superior by design.

© Computer Associates International, Inc.,
One Computer Associates Plaza, Islandia, NY 11788-7000.
All product names referenced herein are trademarks
of their respective companies.

CA90s



Free
Demo Disk



powerful and are wooing users from traditional environments.

UNIX, AS/400, and others offer incredible breakthroughs and (graphical user interfaces).

These hardware platforms are waiting for users to await proven, mission-critical applications to run on these exciting systems.

DOWN-SIZING TRENDS ACCELERATES

What will be needed is a way to integrate innovative, new, cost-effective platforms and technology with clients' existing systems and investments.

One can afford to walk away from past investment and start over, pouring hundreds of millions of dollars into IS systems for several decades, but America is starting to demand a return from its MIS departments.

(Return On Investment) of IS is difficult to measure and impossible to project. But still, a meaningful way to assess it must be found.

One aspect of it that is easy to understand is the amount of money in existing IS systems.

Looking back and adding up the investment in systems, training, development, etc., it's easy to see how much a corporation will be abandoning its current systems.

For corporations who have under no circumstances exercise, it can be quite a challenge. It also puts in a new light proposals to scrap existing systems. ■

INVESTMENT PROTECTION #1 PRIORITY

Many hardware and software vendors are proponents of "starting over" for various self-serving reasons, it is rarely a cost-efficient or rational move for clients. Instead, prudent clients focus on evolutionary technological advances, as opposed to revolutionary ones. There's no reason to throw away existing systems when there's always technology that integrate the old with the new.

COLUMNS

INSIGHTS: SUPPORTING PLAYERS

Coalitions of similar networking companies are helping to fill the most gaping holes in enterprisewide coverage.

By Jack Martin

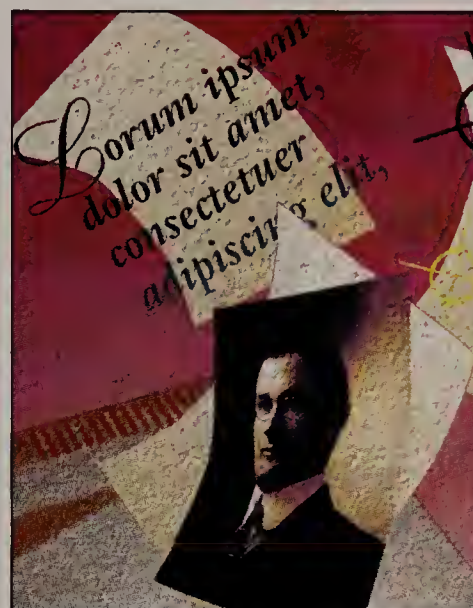
26

STATE OF THE ART: THE FINE PRINT

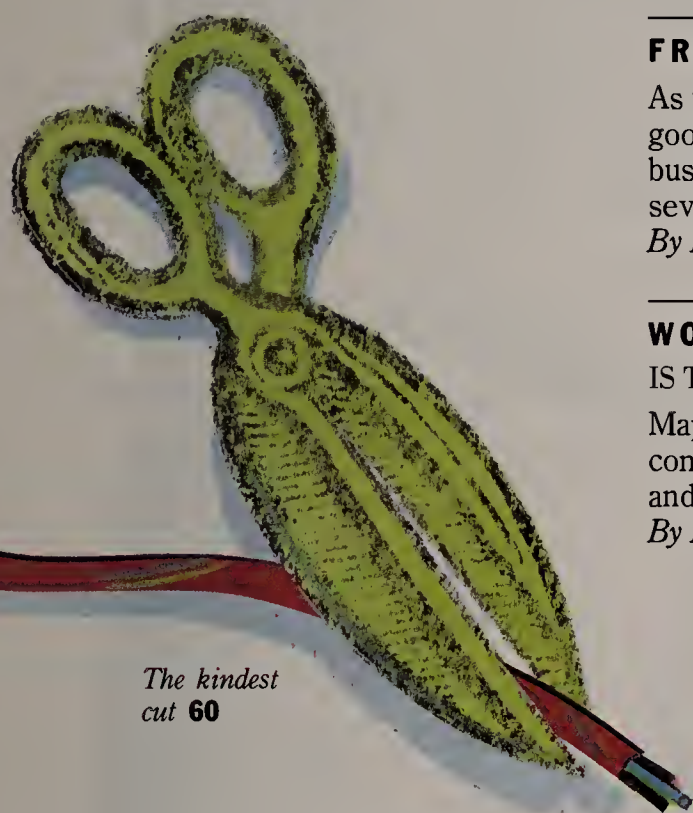
Advanced printer options can help organizations save money and space. They can also substantially change the way information is distributed, processed and presented.

By Lucie Juneau

54



A new press of printers 54



The kindest cut 60

FRONTLINE

As wireless communications technologies begin to make good on their promise of new freedom and flexibility, businesses will increasingly find they can make severance pay.

By Portia Isaacson

60

WORKING SMART:

IS THERE A DOCTOR NEAR THE HOUSE?

Mapping technology is helping The Travelers insurance company sell its managed-care network to employers and improve customer service.

By Megan Santosus

68

DEPARTMENTS

Editor's Letter 8

Publisher's Letter 10

Trendlines 14

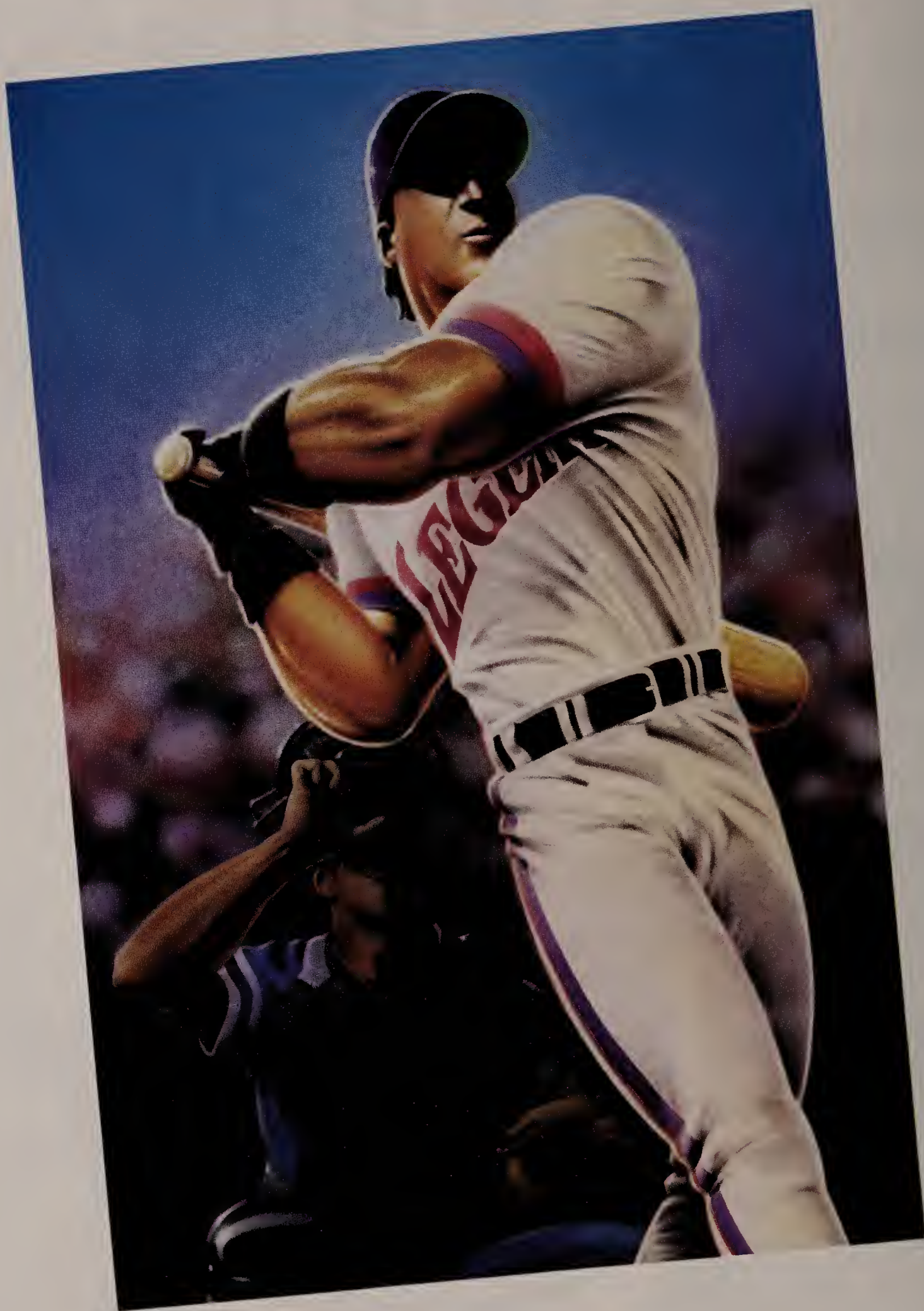
- ▶ Computer training
- ▶ Marketing in Japan
- ▶ Employee empowerment
- ▶ Privacy pitfalls
- ▶ Defining reengineering
- ▶ Creativity retreat
- ▶ ATM check deposits

- ▶ Skills evaluation
- ▶ Customized greetings
- ▶ Fleet credit cards
- ▶ Women and PCs
- ▶ Groupware awards

Index 66



Checking it out 14



IN SYSTEMS MANAGEMENT, IT'S A WHOLE NEW BALL GAME.

The recent joining together of Legent and Goal has done more than create a new, larger company.

It's changed the entire playing field of systems management.

Not because the new Legent is a bigger company than before.

But because we're going to be the one that's best to do business with.

Both Legent and Goal have always been responsive to our customers' needs, with business practices recognized as the fairest in the industry. We intend to continue that tradition.

Both of us have always ranked at the top in customer service. We're going to stay there.

We've always offered outstanding technologies. Now, our combined product lines deliver an unparalleled range of solutions. And together, we're forging an exciting new strategy to allow organizations to expand systems management across the entire enterprise.

The new Legent has nearly doubled in size. That means you'll be dealing with

a company with the strength to guarantee that we'll be here to service you in the years to come.

But our new strength is more than just size. The dedication, quality, and commitment to excellence that characterized the people of both Goal and Legent are what attracted us to each other in the first place. So even though we're a new team, we're taking to the field with the same game plan both of us have always played by.

If you're an IS professional, we think you'll be interested in knowing more about Legent.

Call us at **1-800-676-LGNT ext. 81**. We'll send you a copy of *The New Leader in Systems Management*. It explains why Legent joined with Goal, and what you can expect from the new team; a team dedicated to providing leading edge solutions for systems management.

Find out how the game has changed. From the players who are changing it.





The Home Shopping Network and LDS Hospital may appear to have little in common, but both demonstrate the impact IT can have on an organization's ability to change not only its own face, but the face of its industry.

When the Home Shopping Network was born, there was nothing like it under the Florida sun. Yet in seven years the cable network could boast sales of over a billion dollars, a slew of imitators had experimented with electronic retailing, and cubic zirconium had achieved something approaching cult status.

Senior Writer Meghan O'Leary spoke with Stella Tavilla, HSN's chief information executive, and other top managers about the role IT plays in HSN's phenomenal growth. (See "TV's Perfect Pitch" on Page 38.) "Nothing is done around here if it can't be done through the use of computers," Tavilla says.

HSN has also benefited from the friendly, informal environment within its corporate offices. Tavilla and her executive peers work in close partnership to weave IT into the infrastructure of business operations. This capability is now driving opportunities to sell products for other companies, including Home Box Office.

TV viewers who tune in to the news instead of *Home Shopping* are likely to find a report on the many shortcomings of the U.S. health-care industry. Ensuring high-quality, affordable health care for everyone has become a mandate for politicians of all stripes. Yet health care has been laggardly in adopting technologies that might improve service and cost-effectiveness.

Fortunately, organizations like LDS Hospital in Salt Lake City, are realizing that IT is a powerful component in the delivery of high-quality, cost-contained services. In "Teaching CPR to Health Professionals" on Page 46, Special Projects Editor Allan E. Alter explains how computerized patient records (CPR) systems, pioneered by LDS, can help ease the crisis. The Institute of Medicine of the National Academy of Sciences, for one, is actively supporting the CPR concept.

The intelligent use of IT has done great things for HSN and LDS. But more importantly, these organizations' pioneering approaches to business and technology are influencing the world outside their corporate walls.

Marcia Blumenthal



© By CIO Publishing Inc.

Publisher/Editorial Director JOSEPH L. LEVY

Editor-in-Chief MARCIA BLUMENTHAL

Managing Editor LEW MCCREARY

Art and Design Director MARY LESTER MARSHALL

Special Projects Editor ALLAN E. ALTER

Associate Editor ABBIE LUNDBERG

Associate Editor LEIGH BUCHANAN

Senior Writer THOMAS KIELY

Senior Writer MEGHAN O'LEARY

Senior Writer RICHARD PASTORE

Writer/Researcher MEGAN SANTOSUS

Assistant Art Director MOIRA GILLIS

Design Associate KIM MORNEAU

Editorial Assistant MINA C. AHN

Director of Marketing CATHY O'LEARY HAYES

Production Director LORI BETH SADEWITZ

Production Associate MICHAEL C. PETERSON

Director of Finance & Admin. NANCY A. BRYSON

Assistant to the Publisher DIANE MARTIN

Circulation Director CAROL A. SPACH

Fulfillment Manager SUSAN WOODWORTH

Sales & Marketing Specialist BRIDGET CAMMARATA

Sales and Marketing Assistant DOT CASPERSEN

Circulation Assistant BEVERLY BIGHAM

Administrative Assistant LYNN J. PALMQUIST

VP/GM, Executive Programs LYNDA ROSENTHAL

Executive Program Manager WALTER MANNINEN

Contributing Writers

Portia Isaacson, Lucie Juneau, Jack Martin

Contributing Art/Editorial Assistant

Margaret Thom

Editorial Offices

CIO Publishing Inc., 492 Old Connecticut Path,
P.O. Box 9208, Framingham, Mass. 01701-9208
(508) 872-8200

Subscriber Services

(800) 788-4605

International Data Group

Board Chairman PATRICK J. MCGOVERN

President WALTER BOYD

Executive Vice President WILLIAM P. MURPHY



JULY 1992, PC MAGAZINE DESCRIBES THE PERFECT PERSONAL COMPUTER.

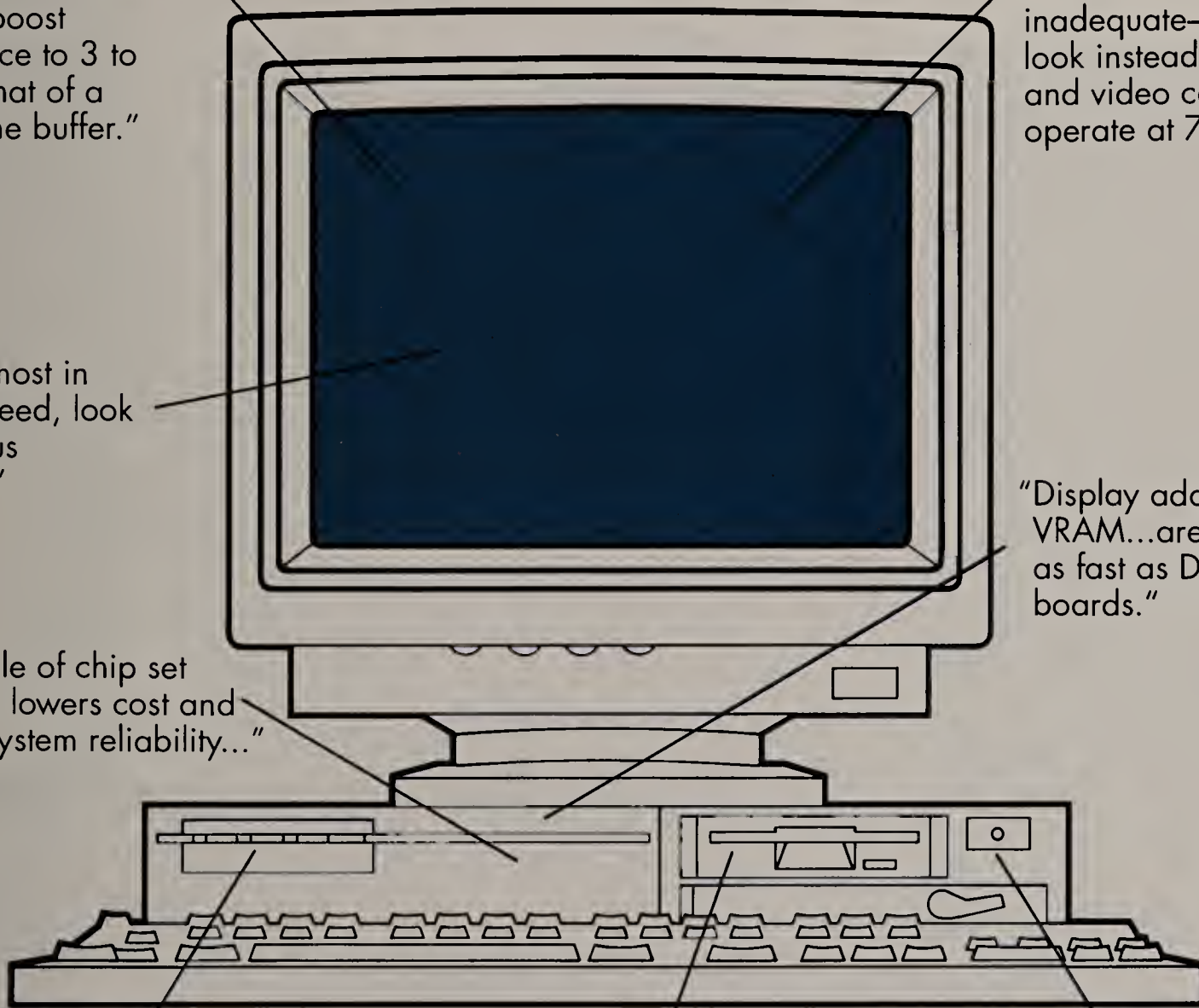
"...if your ultimate PC system runs Windows, an accelerated VGA card can boost performance to 3 to 20 times that of a dumb frame buffer."

"At 1,024-by-768 resolution, PC magazine believes 60 Hz is inadequate—too flickery—... look instead for monitors and video cards that operate at 70 or 72 Hz."

"For the utmost in display speed, look at local bus designs..."

"Display adapters using VRAM...are often twice as fast as DRAM-based boards."

"A high scale of chip set integration lowers cost and improves system reliability..."



"To save space, look for built-in parallel and serial ports, and IDE and video circuitry."

"To take advantage of a 32-bit operating system such as OS/2 2.0 or Windows NT (when it ships), you will want at least 8 MB of RAM, so a 16 MB motherboard may prove limiting in the next couple of years."

"Note that metal SIMM sockets are preferable to plastic ones."



DECpc
BUILT BETTER.
PRICED RIGHT.



DECpc 433dx LP

486DX 33 MHz System

- 4MB RAM • 122MB hard drive
- SVGA non-interlaced color monitor (14", 1024 x 768, 0.28 mm)
- 3.5" 1.44MB floppy drive
- Keyboard, mouse, MS-DOS and Windows
- Free shipping.



DECpc 450dx2 LP

486DX2 50 MHz System

- 4MB RAM • 122MB hard drive
- SVGA non-interlaced color monitor (14", 1024 x 768, 0.28 mm)
- 3.5" 1.44MB floppy drive
- Keyboard, mouse, MS-DOS and Windows
- Free shipping.



DECpc 466dx2 LP

486DX2 66 MHz System

- 8MB RAM • 245MB hard drive
- SVGA non-interlaced color monitor (14", 1024 x 768, 0.28 mm)
- 3.5" 1.44MB floppy drive • Keyboard, mouse, MS-DOS and Windows
- Free shipping. • Call for availability

When *PC Magazine* dreamed of the perfect PC, did they guess Digital was busy building it?

Introducing the new line of Digital-built DECpcTM LP upgradables. Our blueprint was your ultimate PC wish list. And we added a price list to match. Let's start with the item that tops your list: WindowsTM performance.

First, Digital's engineers built in a GUI accelerator that speeds common Windows operations (like scrolling, cursor moves, and color fills). Then, they added local bus video, a 32-bit data freeway connecting the microprocessor to the video controller. The result? Four times the overall Windows performance of an unaccelerated, non-local-bus PC with the same processor.

Digital's engineers didn't stop there. They built in room for up to 64MB of RAM on the motherboard. Added a sophisticated writeback caching strategy. Gave you three expansion slots. And still made room for daughterboard and Vacancy Socket upgrades.

So how easy is it to get everything you've been dreaming of in a PC? Easy. Just call this number today.

BUILT INTO ALL DECpc LP UPGRADABLES

- Upgradable design
 - Local bus video
 - GUI accelerator
 - Vacancy Socket
 - 128KB writeback cache
- 3 full-height ISA slots
 - 4 drive bays
- MS-DOS[®] 5.0 and Microsoft WindowsTM 3.1 installed
 - NetWareTM and PATHWORKSTM certified
 - Up to 72 Hz refresh rate

Desktop Direct
FROM
Digital

1-800-438-4311

Please reference AWW when you call.
Monday-Friday, 8:30 AM to 8:00 PM (ET)

digitalTM

In Canada, call 800-267-6215
In Australia, 008-021246
In New Zealand, 0800-800332

SEPTEMBER 1992, DIGITAL MANUFACTURES IT.

GUI acceleration

Local bus video

Upgradable design

Built-in parallel and serial ports, IDE and video circuitry

VRAM instead of DRAM

Up to 72 Hz refresh rate

Metal SIMM clips

Up to 64MB RAM on motherboard

**\$1,999
425sx**

DECpc 425sx LP 486SX 25 MHz System

- 4MB RAM •122MB hard drive •VGA color monitor (14", 0.29mm)
- 3.5" 1.44MB floppy drive •Keyboard, mouse, MS-DOS and Windows
- Free shipping.

Monitors may differ from those shown.



**BUILT BETTER.
PRICED RIGHT.**

DIGITAL'S NEW PCs OWE IT ALL TO MOTHER.

Using VRAM instead of DRAM speeds video operation by minimizing graphics bottlenecks. 512KB is standard. Expandable to 1MB.

Add up to 64MB of RAM on this motherboard. Plenty of room for all the memory-hogs in your software collection.

The built-in GUI accelerator makes Windows fly, yielding a four-fold speed improvement over standard VGA. With full 1024 x 768 resolution.

The Vacancy Socket is the quick and easy way to upgrade your DECpc. Just add the appropriate Intel OverDrive™ Chip.

Our mother has a daughter. This one carries the microprocessor, cache and data bus for system upgrades.

Pick your brain. 486SX, 486DX, and 486DX2 industry-standard microprocessors are available, in a wide range of speeds.

For faster video performance, take the local bus. This 32-bit data highway means your DECpc's microprocessor never slows down for video access.

These DECpcs not only have a 128KB cache standard (with room for up to 256KB), it's writeback cache. That's the most advanced memory-caching strategy.

This couldn't be the perfect PC if it didn't have the perfect mother. Well, what a beauty she is.

Our new motherboard was born in Digital's very own, highly automated, ISO 9000-compliant factory. As opposed to somebody's garage.

But the real beauty of this mother is how much she does for you. She takes care of the floppy drive and the hard drive. Provides for the video controller and the GUI accelerator. Even tends to two serial ports and one parallel port. And because this motherboard takes care of all the basics, you can use her three expansion slots to truly customize your system.

Our mother even has a daughter. To make upgrading to as-yet-to-be-dreamed-of microprocessors as easy as swapping a daughterboard.

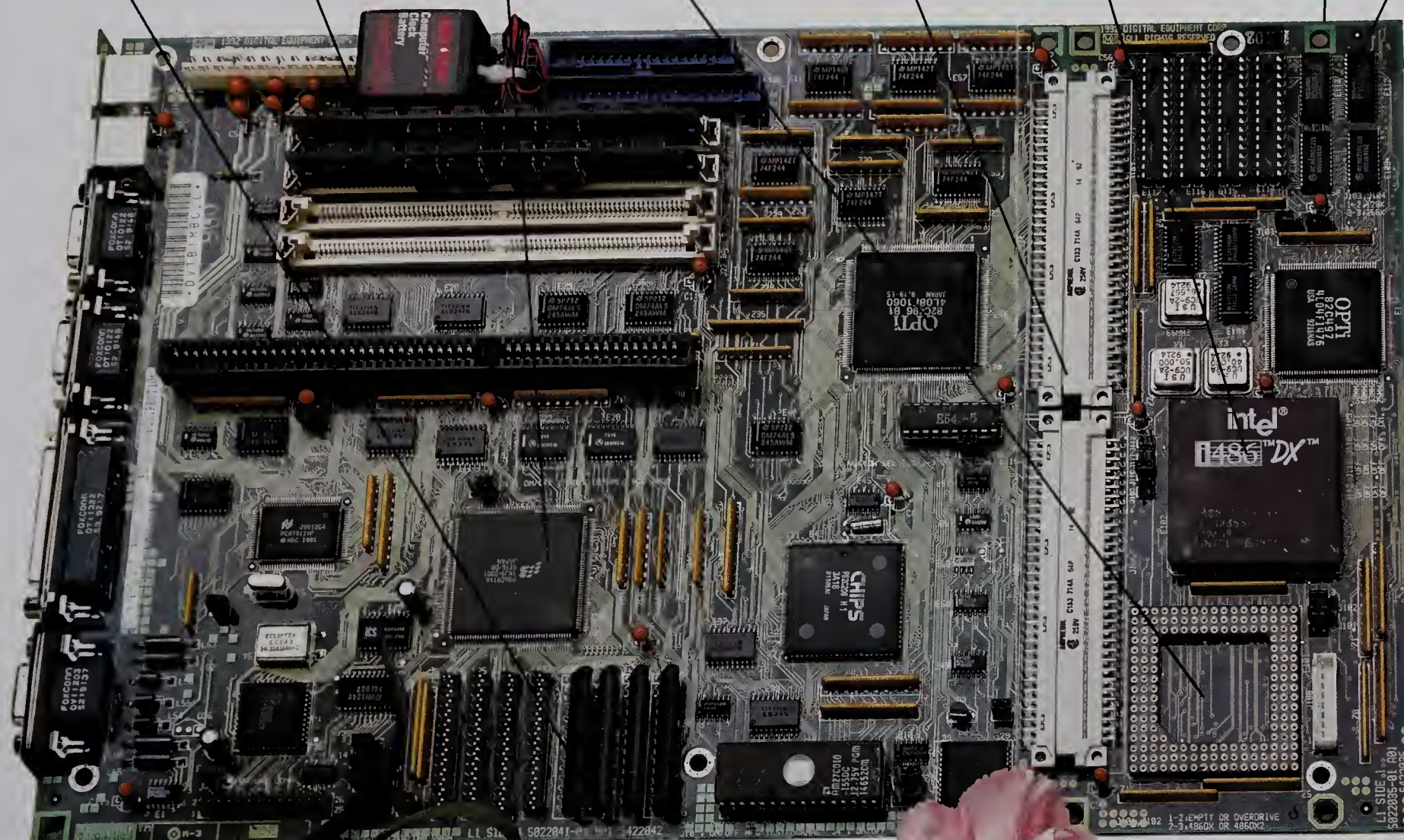
Shouldn't everybody have a mother like this?

To order, call 1-800 PC BY DEC.

COMPARE FOR YOURSELF.

	DECpc 433dx LP	Compaq Deskpro 433/i	Dell P-Family 433
Upgradable	yes	yes	yes
Cache included	128KB	8KB	8KB
Cache maximum	256KB	64KB	256KB
GUI acceleration	yes	yes	no
Local bus video	yes	no	no
Maximum RAM	64MB	32MB	64MB
Hard disk bays	2	1	1
List price	\$1,849	\$2,449	\$1,849
Estimated street price	\$1,849	\$2,252	\$1,849
30-day money-back guarantee	yes	no	yes
Shipping included	yes	N/A	no

4MB RAM, 120MB hard drive, keyboard, mouse, DOS, Windows, no monitor. Competitive price survey 8/10/92.



	DIGITAL	COMPAQ	IBM	DELL
Free one year service performed by manufacturer	YES	NO	NO	NO
30-day, no questions asked money back guarantee	YES	NO	NO	YES
Multivendor service support available	YES	NO	YES	NO
Application support available	YES	NO	YES	NO

EVEN OUR SERVICE IS AN ENGINEERING BREAKTHROUGH.

All DigitalTM PCs come with two mission critical features only Digital engineers could have designed: Digital service and Network Certification.



For example, our one-year on-site service is performed by our *own* 10,000⁺ person service force which includes more Novell[®] certified engineers than any independent service vendor ever dreamed possible. That's a Digital exclusive.

Based on the breadth of our software alliances, Digital can offer you fast, in-depth, detailed software support for more than 100 popular applications.

While our exclusive Multivendor PC Service Plan covers just about every manufacturer in the PC arena including Apple[®].

As one of the developers of Ethernet (and PATHWORKS Network Operating System), nobody is better than Digital at giving your users seamless access to data anywhere in your LAN or WAN on any computer you own. Our special networking labs test Digital PC interoperability in every configuration imaginable. So when Digital says Network Certified, it's more than a seal of approval, it's a statement of fact.



Every Digital Desktop PC Includes:

- Factory installed MS-DOS 5.0 and WindowsTM 3.1
- 30-Day Money Back Guarantee
- One-Year On-Site Service
- Lifetime Technical Support
- 24-Hour FAX Support
- Free Shipping

The DIGITAL logo, DECpc, DECtaser, DECmultiJET, VAX and Desktop Direct are trademarks of Digital Equipment Corporation. i386SL and Intel are trademarks of Intel Corporation. WindowsTM and MS-DOS are registered trademarks of Microsoft Corporation. Apple, AppleTalk and Macintosh are registered trademarks of Apple Corporation. Dell is a registered trademark of Dell Corporation. IBM is a registered trademark of International Business Machines Corporation. Kodak is a registered trademark of the Eastman Kodak Company. Toshiba is a registered trademark of Kabushiki Kaisha Toshiba. Lotus, 1-2-3, Works, Agenda and Freelance Graphics are registered trademarks of the Lotus Development Corporation. QA Plus is a registered trademark of the Diagnostic Software Corporation. Ami Pro is a registered trademark of Samna Corporation, a wholly owned subsidiary of Lotus Development Corporation. FAXitTM is a trademark of Alien Computing. Novell and NetWare are trademarks of Novell, Inc. UNIX is a registered trademark of UNIX System Laboratories. MS-DOS is a registered trademark and Windows is a trademark of Microsoft Corporation. PC MAGAZINE is a registered trademark of Ziiff Communications Company. Quotes used by permission.

80MB or 120MB
Hard Drive

2MB to 8MB of
memory to meet
anyone's needs

8.7" x 11.7" x 1.7"

Concurrent Video
lets you run an external VGA monitor and
the notebook display
simultaneously

Built-in trackball
pointing device lets you
work in close quarters

Logitech TrackMan
Portable included at
no extra charge

The new 4 hour
NiMH Battery

3.5"
1.44MB
Floppy Drive

6 LBS. FULLY LOADED!

The DECpc 325P gives you the best features of all the best desktop PCs and notebooks rolled into one. Features like an NiMH battery, to keep you up and running for 4 straight hours. 25MHz of power. Your choice of 4MB RAM with an 80MB Hard Drive or 8MB RAM with an impressive 120MB Hard Drive. Factory installed MS-DOS 5.0 and Windows 3.1. A 9600 bps FAX modem with FAXit™ for Windows. And the best feature of all – low price.

- 386SL 25MHz System
- 4MB RAM • 80MB Hard Drive
- 10" Triple Super Twist Backlit VGA
- LCD, 3.5" 1.44MB Floppy Drive
- Built in trackball and Logitech™ TrackMan® Portable
- Price: \$2,795

- 386SL 25MHz System
- 8MB RAM • 120MB Hard Drive
- 10" Triple Super Twist Backlit VGA
- LCD, 3.5" 1.44MB floppy drive
- Built in trackball and Logitech TrackMan Portable
- Price: \$3,295

DIGITAL NOTEBOOK SERVICE: WE'LL BE THERE WHEN YOU GET THERE.

Our special Digital Notebook Service Policy includes •Lifetime Technical Support •Available software support for more than 100 applications •30-day Money Back Guarantee •One-Year Return-To-Factory Service •QA Plus® Diagnostics. We'll even send your repaired Notebook back to you within 48 hours after we receive it! You can also upgrade to our new premium DEC Passport Service option. Passport offers express courier pickup, 24-hour repair, overnight courier back to you and next destination forwarding within the same country — also available in many European cities.



DECpc™ 333sx LP

Powerful, entry-level Windows™ computing

The DECpc 333sx LP gives you big power — at a little price.

- 386SX 33MHz System
- 64KB cache
- 4MB RAM • 122MB Hard Drive
- 14" VGA Color Monitor
- 3.5" 1.44MB Floppy Drive
- Keyboard and Mouse
- MS-DOS 5.0 and Windows 3.1 installed
- Price: \$1,549

ACT BEFORE OCTOBER 30 AND GET A FREE APPLICATION!

Right now, buy any DECpc Desktop or Notebook, and choose any one of these popular programs absolutely free.

But hurry! Special offer expires October 30, 1992.

Application	Retail Value
Lotus® 1-2-3® for Windows.....	\$595.00
Lotus Ami Pro™ 2.0.....	\$495.00
Lotus Freelance Graphics™ for Windows	\$495.00
Lotus Works™ 3.0	\$149.00
Lotus Agenda® 2.0.....	\$199.00
Lotus 1-2-3 version 3.1+	\$595.00
Lotus 1-2-3 version 2.4	\$495.00
Lotus Freelance for DOS.....	\$495.00

ANOTHER DECADE OF DIGITAL INNOVATION.

- 1992** DEC named fastest growing PC vendor. Announces full line of high-performance, low-profile upgradable PCs.
- 1992** DEC opens the world's most advanced PC manufacturing plant to produce a new generation of more powerful PCs.
- 1991** DEC and Microsoft® announce a joint development alliance, giving each company access to the other's technology and service resources.
- 1990** Digital introduces and shares water-based manufacturing technology that will eliminate fluorocarbons that destroy the Earth's atmosphere.
- 1988** Digital expands its Network Application Support (NAS), unveiling the industry's most open computing environment for the 1990s.
- 1988** Digital and Apple announce an agreement to link Macintosh® and AppleTalk® with VAX® and DECnet/OSI enterprise networks.
- 1980** Digital, Intel™ and Xerox® jointly introduce Ethernet.
- 1977** First VAX is introduced.
- 1960** Digital ships world's first PC (PDP-1). Includes first interactive computer game.

SPECIAL NOTICE TO OUR GOVERNMENT CUSTOMERS

From now through September 30, 1992, Digital offers an additional 3% off products purchased off the new GSA/BC schedule. For current prices, technical support and order placement, just call:

1-800-DIGITAL

Ask for the Government Contract Group and reference GSA Contract Number GS00K92AGS6158.

DECpc 466ST A towering achievement

Get 66MHz of computing power today, plus industry standard Xpress EISA technology to let you upgrade to new levels of power tomorrow.



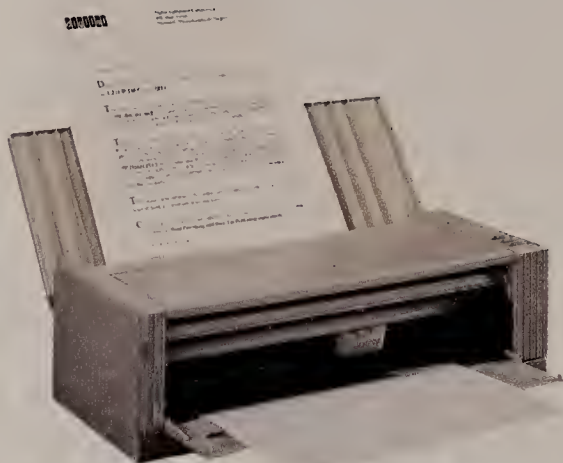
- 486DX2 66MHz System
- 128KB Cache • 4MB RAM
- 105MB Hard Drive
- 14" Low Radiation SVGA Non-Interlaced Monitor (supports up to 1024 x 768)
- 3.5" 1.44MB Floppy Drive
- MS-DOS 5.0, Windows 3.1 and Mouse

* Price shown includes 14" monitor. Photograph shows 19" monitor available for \$5,399.

AND NOW, A SPECIAL OFFER ON DIGITAL'S FAMILY OF PRINTERS.

Order a Digital printer when you buy any Digital PC before October 25, 1992, and get 10% off the price of the printer. Choose any popular laser, ink-jet or dot matrix printer, and you'll get this special savings *plus* • Free One Year On-Site Service • Free Delivery • Free Parallel Cable.

DECmultiJET 1000: Laser quality printing at a less than laser price



- Bubble ink-jet printer with 50-nozzle printhead
- Built-in HP® DeskJet Plus® emulation
- Prints up to 160 characters per second
- 300 x 300 dots per inch resolution
- Prints on plain paper, transparencies, envelopes
- Cartridge slot for emulation, font or RAM upgrade
- Resident Fonts: Courier, Courier Landscape, Times Nordic, Letter Gothic
- Price: ~~\$329~~ \$296.10
- Order No. FR-LJ16P-AA

DEC LA70: High quality dot-matrix printing at a special low price



- Built-in IBM Proprinter® II emulation
- 9-Wire, narrow carriage
- Prints up to 200 characters per second
- Supports MS Windows
- Serial and parallel interface
- Draft, memo or near letter quality printing
- Handles fanfold, cutsheet, envelopes, labels and 3-part forms
- Price: ~~\$299~~ \$269.10
- Order No. FR-LA5S-AA/ZTY

THE FASTEST PRINTERS ON THE ROAD TODAY.



In head to head tests, *PC Magazine* pitted the DECmultiJET 1000 ("DECjet 1000") against portable printers from Brother, Canon, Citizen, Kodak® and Toshiba®. The results? *PC Magazine* reports "the DECjet...had the highest speeds in quality printing: 49 cps in both emulations."

Epson Emulation

■ Draft ■ Quality

Characters per second	0	20	40	60	
Brother HJ-100i Ink Jet Printer	N/A †				42
Canon BJ-10ex Bubble Jet Printer	N/A †				39
Citizen PN48 Notebook Printer	N/A †				24
DECjet 1000					69 49
Toshiba ExpressWriter 201	N/A †				18
	Worst			Best	

IBM Emulation

■ Draft ■ Quality

Characters per second	0	20	40	60	
Brother HJ-100i Ink Jet Printer	N/A †				42
Canon BJ-10ex Bubble Jet Printer	N/A †				42
Citizen PN48 Notebook Printer	N/A †				24
DECjet 1000					65 49
Toshiba ExpressWriter 201	N/A				
	Worst			Best	

N/A † Not applicable. This printer does not operate in draft mode
N/A †† Not applicable. This printer does not support this emulation

Call for the latest Desktop Direct from Digital catalog to see the full range of high quality, low-priced Digital printers.

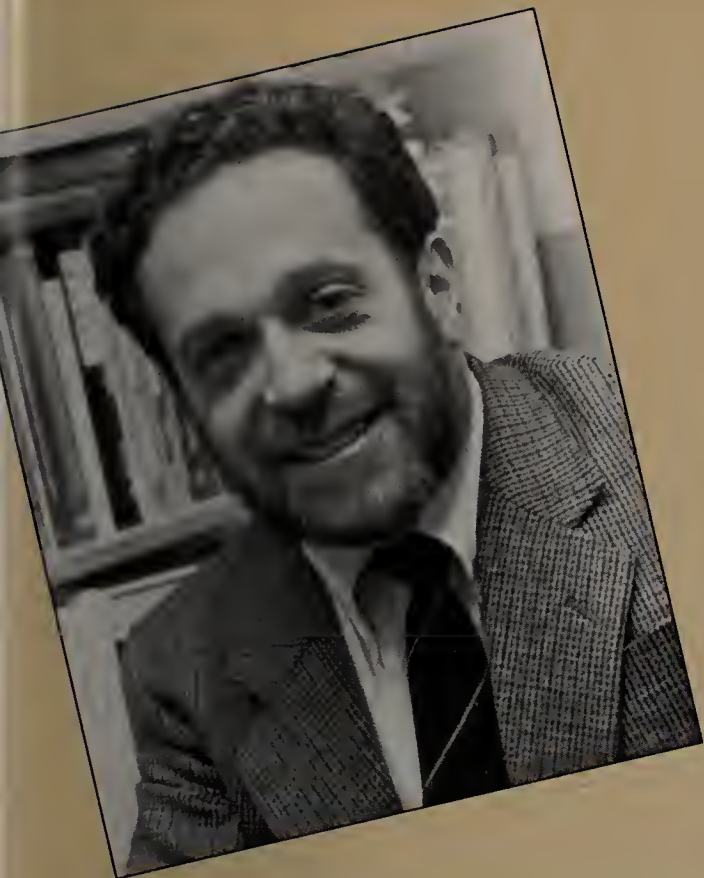
Desktop Direct
FROM
Digital

1-800-438-4311

digital™

Please reference AWW when you call.

Mon-Fri 8:30am to 8:00pm (ET)



In "...the coming century there will be no national products or technologies, no national corporations, no national economies... Each nation's primary asset will be its citizens' skills and insights; information—and how it is leveraged—will become the critical success factor for business survival in the new global economic web."

Professor Robert B. Reich
Kennedy School of Government
Harvard University

THE CIO PERSPECTIVES SERIES sm

IT Assets: Balancing People, Property and Performance

A three-day conference moving beyond physical IT assets to intellectual property and human capital—employees, information and processes—and the positioning of IT as a corporate asset.

**Sunday, March 7 through
Wednesday, March 10, 1993
La Paloma
Tucson, Arizona**

**For more information or to enroll,
call 800/366-0246**



THE MAGAZINE FOR INFORMATION EXECUTIVES

C O R P O R A T E H O S T S

BOOZ·ALLEN & HAMILTON



Racal-Datcom™





As reported in this issue of *CIO*, there is no blueprint that can be used to determine if downsizing is the right solution to an organization's computing challenges. What is emerging, however, is a growing consensus among information executives and downsizing experts on both technical and business considerations, which executives must weigh carefully before making this critical decision.

While a growing number of companies are moving to smaller, distributed platforms, many more have yet to bite the downsizing bullet. For these organizations, the perceived limitations of various new technologies appear to be the primary barrier to change. If small-platform hardware, software and operating systems still can't match mainframe functionality, why change? Thus reason those who opt for the status quo.

If IT vendors want to help organizations make this weighty decision, the industry as a whole is going to have to do a much better job of articulating effective downsizing strategies and the associated business benefits of moving to small-platform hardware and software.

The impetus for change often comes not simply from the availability of new technologies, but from the example of companies that have gained a business advantage by successfully exploiting IT. The more real-world experiences *CIO* can bring to light, the better for our readers who may be weighing such a move.

I would like to extend my thanks to the information executives from Firstline Trust, the City of San Antonio, HFC Bank and J.M. Huber Corp. for sharing their downsizing experiences with us in this issue.

Wayne L. Woz

Coming In CIO

Strategic Outlook: Databases

Networking multiple systems in order to distribute data to end users may be the biggest challenge confronting IS. While it is usually possible to physically link existing systems and adequately move information among them, doing so raises a litany of concerns regarding data integrity, security, performance, consistency and timeliness.

IS Altruists

Conventional wisdom has it that nonprofit means bare-bones budgets, lack of business savvy and a certain dullness that comes from working in a non-competitive environment. So how come some nonprofit IS organizations are putting their commercial counterparts to shame?

Small Companies, Big Risks

CIOs must frequently gamble mission-critical systems on untested products, either to achieve a modicum of competitive advantage or simply because nothing more venerable exists. Thankfully there are several strategies, some common and some crafty, to help minimize the risks and maximize the rewards.

Access

*Re-engineering:
the software solution*



The future is here but the past is still here too.

Client/server, point and click.... You need to support new approaches, but what about the years of effort and tens of millions of dollars tied up in existing mainframe applications?

Now you can have the best of both worlds.

With software from Early, Cloud & Company you can access 3270 applications from any terminal or workstation. You can simultaneously access different applications and integrate the information where needed. Access is immediate, and transparent. All without modifying existing applications.

Do more with less. Before you commit to a re-engineering strategy that requires a major hardware investment, consider the software solution.

To learn more about how you can have access, call 1-800-829-2050 ext. 800.



Early, Cloud & Company™

Aquidneck Industrial Park Newport, Rhode Island 02840



Now There's A Strong CASE For Managing Change.

Whether it's confronting the competition, facing legislative pressures or anticipating shifts in the marketplace, change is here to stay. To help you manage change is IEF™ CASE software from Texas Instruments.

The IEF is recognized as the leading tool for achieving integrated CASE solutions.

It offers a diverse portfolio of software that enables you to do everything from rebuilding high maintenance-cost systems to developing new enterprise-wide strategic systems. And with the IEF, you can do it more efficiently and with higher quality.

Among its many features, the IEF delivers truly integrated CASE toolsets and reusable application logic. This reduces the time and risk of application development, and thus provides a higher return on your investment.

In addition, developers can construct and maintain applications for multiple computing environments from a single business system specification without modifications.

But when application changes are necessary, the IEF executes them at the diagram level, not code. So, for the life of your system, specifications will always match the executing application.

Through it all, the IEF offers the ongoing training and support of software experts whose success is measured by yours.

Anticipating our customer's needs, we're delivering new and enhanced products this year that are enabling the IEF to support cooperative processing and the client/server application model. And with our strong research and development resources, you can depend on the IEF's continued leadership in integrated CASE technology. Let us show you the best CASE for managing change. For more information, call us now at **1-800-527-3500**.

Government purchasers, please reference
GSA #GS00K92AGS5530.



IEF is a trademark of Texas Instruments Incorporated.

TRENDLINES

COMPUTER CLASSES

NOT-SO-STUPID TRAINING TRICKS

Who says computer training has to be boring? Well, OK, lots of people. But some trainers work hard to help people forget they're sitting in front of a computer fiddling with unfamiliar software, so that they will relax, participate and learn.

Lou Russell, president of Russell Martin and Associates, a training company in Fishers, Ind., goes to great creative lengths to teach both end users and programmers some pretty technical stuff.

Russell uses lots of interaction, music and soft colors during highly technical classes because she finds they prevent her students from being too burned out at the end of the day. Her students always work in groups, sitting at desks with colored pens, Post-Its and candy.

When reviewing technical concepts or functions, she often lists them on a flip chart that goes on the wall for reference, so that after a two-day course, the students "own the room." These techniques help trainees to feel less inhibited and participate more freely, Russell believes.

Russell has her students set and review goals for each session and rewards them for asking questions, especially those they may think are silly. The professionals and executives who attend her classes get downright competitive about the "fabulous merchandise"—including su-

perballs, rubber men and doodads to hang from the end of your pencil—that Russell gives out for each question asked.

Russell admits that occasionally a student is not com-

fortable with all the game-playing and refuses to participate, which is also OK. Her unorthodox and sometimes silly-seeming techniques are no reflection of her seriousness about training. "These are accelerated learning techniques," she said. The games and prizes are a way to stimulate trainees' senses and imaginations, so that they will retain more of what they learn. Long-term learning is the goal.

Russell uses a number of traditional measurement tools including student self-evaluations, setting and tracking daily goals and follow-up evaluations. But she speaks with greater animation when she describes how one class of managers presented what they had learned at the end of their three-day training session: They broke up into groups and performed rap numbers. ■



LACKING DEFINITION

Add this to your collection of Murphy's Laws: The more popular the buzzword, the more it is misunderstood. Consider the results of a recent study on reengineering:

In a survey of 121 senior executives at major corporations, 88 percent of respondents said their companies had carried out reengineering programs in the past three years—more than restructuring, downsizing or outsourcing. However, only 46 percent defined reengineering as workflow or process redesign. Others thought reengineering meant technology change (17 percent), product changes/improvements (16 percent), improved efficiency (8 percent) or customer satisfaction (4 percent).

These executives also expect rapid results from their reengineering efforts—however they are defined. About 60 percent hope to see results in one year or less; 91 percent in two years or less.

The telephone survey of CEOs and their direct reports at manufacturing, insurance and utilities companies in the United States was conducted by Gateway Information Services, a management consulting firm with offices in New York and Indianapolis. ■

A TEST OF SKILLS

If you've ever suspected that a programming applicant has engaged in a little resume embellishment, there's a software program that just may be the best fib-catcher since the polygraph.

TECKCHEK, from Bookman Consulting Inc. in New York, is a series of expert-system proficiency tests for training and assessing programmers on all platforms. By emphasizing practical skills rather than book knowledge, TECKCHEK measures current level of proficiency, not potential ability. Each TECKCHEK question presents a specific programming situation using actual code. The questions are unambiguous, and there is only one correct answer.

Test-takers use a self-adjusting response system that proceeds to a more difficult or an easier question depending on how the previous question was answered. A beginning programmer, therefore, is not confronted with increasingly difficult questions, nor does a skilled programmer have to sit through an elementary test.

The tests can be administered on-site on IBM and compatible PCs. The process takes about an hour, and results are available the same day. A full-page evaluation reports on the test-taker's technical understanding of programming applications, depth of practical experience and work speed/accuracy ratio.

Technical knowledge tests are available for IBM's Cobol, Cobol II, DB2, SQL/DS, CICS, VSAM, IDMS, C and DOS. ■

**Application Performance Management
can make your IS department more
responsive, your developers more productive,
your applications more efficient.**

**Then again, you could always ask your
Board of Directors for more money.**



If supply can't go up, demand must come down.

And the key to decreasing demand is improving your applications' performance.

Now there's a way to do just that. Application Performance Management.

With an APM strategy, IS departments in MVS mainframe environments can manage performance and cost throughout an application's life cycle. As a result, applications are deployed on time and provide high performance from Day One. What's more, APM proves truly invaluable in the long term, because it helps you keep performance high even when business requirements,

workload and technology change.

The bottom line? You save money, satisfy customers and give your company a competitive edge.

Who knows, you might even bring a smile to your Directors' faces.

How do you get Application Performance Management working for your IS department? Through *STROBE* and *APMPOWER* from Programart. For a free demonstration of just how much you can save, talk to us today at **617-498-4005**.

It's got to be better than talking to the Board.

PROGRAMART
CORPORATION

TRENDLINES

MARKETING IN JAPAN

WE FEEL A NICHE COMING ON

When it comes to buying pigs in pokes, the Japanese aren't especially interested. If they can't put their hands on it, kick the tires, ring the bells and push the buttons, it's generally no sale. Consequently, direct marketers seeking to establish a presence in Japan have a significant cultural obstacle to overcome.

Japanese resistance to catalog shopping is apparently well entrenched. According to data gathered by a Japanese direct-marketing association, as of 1989 more than 68 percent of all Japanese had never made a catalog purchase. Of these, 86 percent were deterred by the inability to see and touch products. After all, a picture is not the thing itself.

However, according to a study commissioned by MarketPulse, a database-marketing company in Cambridge, Mass., this resistance appears to be softening somewhat. The study, which was carried out by a Tokyo business school professor who worked with L.L. Bean

on its Japanese marketing strategy, reports that catalog sales in Japan have been growing at a 15.9 percent annual clip since 1981.

According to MarketPulse President Francie Anhut, this growth rate is fueled both by Japan's increasing embrace of heterogeneous lifestyles and by Japanese consumers' intense cost-consciousness. Catalogs, says Anhut, in effect become attractive, self-contained "niche markets" bearing specialized products that offer consumers the opportunity to differentiate themselves from others.

Despite this hunger for U.S.-style individuation, however, the reason most often given by consumers (71.5 percent) for making a catalog purchase was lower price.

To accommodate consumers' desire to examine products in person, many enterprises are establishing a retail presence in Japan before beginning their direct-marketing push, according to Anhut.

The survey estimates that there are as many as 5,000 catalog/mail-order businesses operating in Japan; the top 150 companies account for 90 percent of total revenues. Apart from catalog sales, other forms of direct marketing have yet to gain a foothold in Japan. Also contributing to the overall slow growth of such initiatives is the traditional deference manufacturing companies show their dealer networks, who are regarded as "owning" the customers, Anhut said. ■

GROUPWARE LOVEFEST

At the first annual Groupware Conference & Exposition, held in August in San Jose, Calif., a handful of software companies garnered "Best of Show" recognition for product offerings in a number of groupware categories.

Reach Software Corp., of Sunnyvale, Calif., was honored twice, first for a Windows-based E-mail client product called MailMAN, which enables access to a variety of E-mail servers, databases and applications. It also won in the groupware development tools category for WorkMAN, a package that organizes, routes and processes information among users engaged in a task.

Among products supporting group information-sharing, Corporate Memory Systems Inc., of Austin, Texas, won recognition for CM/1, a hypertext tool that supports qualitative decision-making in large, complex projects. Powercore Inc., of Manteno, Ill., was rated best for Network Scheduler 3, a group calendar and resource-scheduling system. Group Technologies Inc., of Arlington, Va., took top honors in the electronic-conferencing category with a Macintosh-based software product called Aspects, which allows multiple conference participants to dynamically edit and annotate a group document simultaneously.

Finally, Lotus Development Corp., of Cambridge, Mass., received a special award for its overall contributions to groupware development. ■

THE CHECK IS ON THE SCREEN

What you see is what you get at Pittsburgh National Bank. It seems that while 70 percent of the bank's customers are comfortable withdrawing money from an ATM, only about 15 percent will use the machines to make a deposit. "When they hand their checks over to a [teller], customers know the bank is handling it," said a bank spokesperson. But not everyone is willing to entrust his or her paycheck to some faceless electronic teller.

Hoping to allay customer fears, the bank is installing machines that display on-screen an image of a depositor's check. Developed by InterBold, a joint venture of Diebold Inc. and IBM, the machine accepts

a check, displays its image and then prompts the customer to verify the amount of the transaction. The bank has installed five of the ma-

chines at its main branch location and hopes to have 30 more up and running at other sites by the end of the year. ■





Subscribe And Save.

~~\$94*~~ **\$59**

Yes, enter my one-year subscription to *CIO* magazine and bill me later for only \$59, a savings of over 37% off the basic rate.

Name

Title

Company

Address

City

State

Zip

The basic one-year
subscription rate for
CIO magazine is \$94.

**This is a domestic rate only (Canada & US). The foreign rate is \$175 US.*

AD92

**PROCESS
IMMEDIATELY**



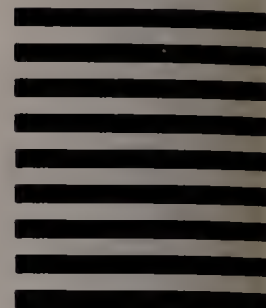
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900



A black and white photograph of a man in a suit and tie, smiling and making a peace sign with his right hand. The photo is framed by a torn paper effect.

**When the system fails to deliver value,
the users will change the system.**

Windows. Client-server computing. LANs. SQL. Open Systems. Today's array of computing trends and standards still isn't enough to guarantee end-users the value they require.

Express/EIS is. It's the heart of EIS II, the complete corporate computing solution available exclusively from Information Resources.

Open to multiple user interfaces,

platforms
and operating
systems,

EIS II provides

one unified software architecture for executive, sales, marketing and finance applications enterprise-wide. Plus true

data-driven analytical power and compatibility with existing databases.

EIS II goes far beyond the simple information access and data display of first-generation EIS. It delivers the added value needed for end-users to re-engineer today's most critical business functions.

We'll prove it. With real-world success stories explaining how leading organizations are solving complex business problems by delivering value to their end-users.

Call now for a free EIS II
Solution Kit. 1-800-765-7227
(416-221-2100 in Canada).

**information
resources**

SOFTWARE PRODUCTS GROUP



EIS II

TRENDLINES

EMPLOYEE EMPOWERMENT

TAKING THE DRIVER'S SEAT

Involving employees in decision-making is a popular concept that can easily go wrong (see "The Perils of Power," *CIO*, May 1, 1992). Oftentimes, efforts are undermined by management's inability to really let go of the reins. But when Zimbrick Inc., a \$165 million auto dealership in Madison, Wis., decided to let its employees direct the complete overhaul of its information systems, it didn't take any half measures.

"[Our company's] philosophy is one of employee empowerment to the fullest possible extent," said David Hanson, CFO and chairman of the DP steering committee. "Who better [than the users] to decide what our systems should do?"

An employee user group broke into teams to identify the needs of the various business segments. "Consensus" needs were set as priorities in developing the company's request for proposals. (Zimbrick contracted with an outside consultant to help the group develop this critical document.)

Interested vendors made both written and oral presentations to the group. A site team then visited dealerships using systems from the two vendors in which the group was interested, and the final selection was made in a blind vote requiring a two-thirds majority.

"The steering committee rubber-stamped that decision," said Hanson, who also served as facilitator of the user group. The whole process took about six months, and conversion began last August.

Involving employees in the decision-making process not only ensures that the sys-

tems that get built are the systems that are really required, said Hanson; it also increases employee buy-in, smoothing the conversion process and lessening the learning curve to the new systems.

Such "focus groups," as they've come to be known, have tackled other problems at Zimbrick, including the design of a comprehensive employee-benefits program. According to Hanson, "We're going to gain as much benefit from the experience as we are from the system itself." ■

A VOYAGE OF DISCOVERY

Sometimes the best way to move forward is to retreat. That's why the entire IS department at Sears, Roebuck and Co.'s Discover Card Services unit retired to Wisconsin recently for three days of creativity training and cogitating.

Working with a creativity consultant, systems employees (including support staff) and managers brainstormed ideas on how to get closer to the business side of the company. "Our company doesn't sell plastic; it sells systems," said Chuck Johnson, director of systems. "To do that right we have to work with business hand-in-hand, in new, creative ways."

Discover staff practiced such creativity techniques as the blue-slip method, a variation on brainstorming using slips of paper, and mind-mapping, a visual exercise that helps groups link core ideas to multiple divergent musings. Johnson pronounced the retreat a big success: In addition to all the good ideas pulled from the sessions, "it provided an opportunity for us to get to know each other better."

The department's fourth annual retreat was part of a wider effort to promote empowerment and creativity. ■

COMPUTERS ARE A GIRL'S BEST FRIEND

PCs appear to be breaking down gender-based task distribution in the workplace, according to a recent study by Logitech Inc. of Fremont, Calif. The "PCs and People Poll," a survey of 300 business computer users, indicates that the PC has redirected many administrative tasks—especially those traditionally handled by female secretaries—to individual computer users regard-

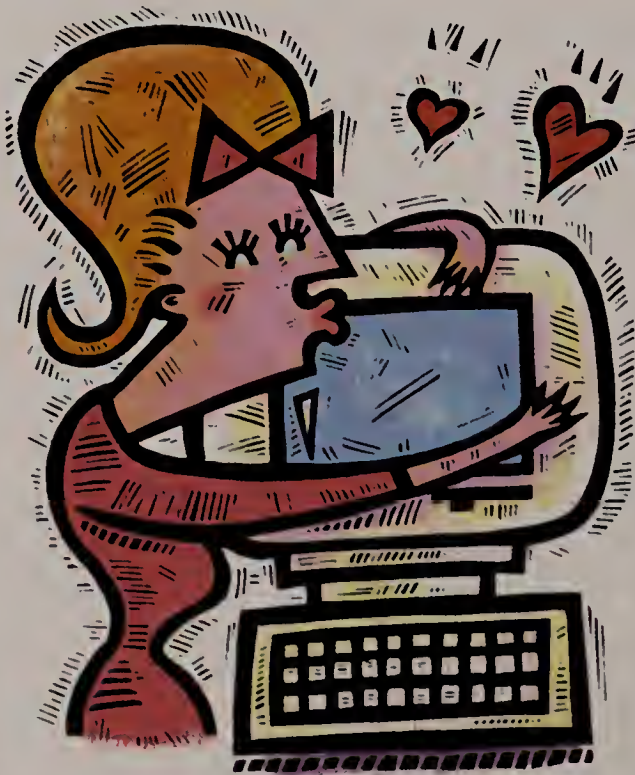
less of their gender.

The study suggests that PCs have helped women rise in the corporate hierarchy based on their business contributions rather than on how many words they can type per minute. Perhaps as a result, women are more likely than men to attribute job satisfaction and productivity gains to the PC.

In other findings, while more women than men (48 percent over 26 percent) were initially worried about learning to use computers, women are more likely than men (84 percent compared to 74 percent) to think computers are fun. Ninety-one percent of women said they would use a PC even if their jobs did not require it, as compared to 85 percent of men.

Men are more interested in computers that respond to verbal or sensory commands and can "become an extension of their own senses." Fifty percent of all respondents said they consider their PCs to be a "natural extension" of themselves.

The poll suggests that computerphobia is more myth than reality. Nonetheless, some users may be getting a little too cozy with their PCs. Thirteen percent credit their computers with having a personality, and nine percent have given them names. ■



1-800
RACAL
55

DIAL AND LEASED
LINE MODEMS



NETWORK
INTERFACE CARDS



TO MOVE MILLIONS OF BITS OF INFORMATION,

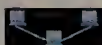
THROUGH THOUSANDS OF WORKSTATIONS,

TO HUNDREDS OF LOCATIONS,

WITH DOZENS OF PROTOCOLS,

CALLS FOR ONE SOLUTION.

LAN-TO-LAN



NETWORK
MANAGEMENT



LAN-TO-WAN



1-800
RACAL
55



NETWORK
OPERATIONS



T1 AND E1
SYSTEMS



RYPTM



DIGITAL
ACCESS



CONSULTING
SERVICES



FIBER PREMISES
DISTRIBUTION



PROTOCOL
CONVERSION



1-800
RACAL
55

At Racal-Datacom, we want to solve your business problems, not just your network problems. That's the networking viewpoint we've held for more than three and a half decades, while serving thousands of customers worldwide.

A NETWORKING PARTNER

We have more networking tools at our disposal than any other data communications company — more than 350 different products and systems for LANs, WANs, and internetworking. From workgroup systems to enterprise-wide solutions. Designed, manufactured, and warranted by Racal-Datacom. And controlled by a comprehensive, distributed network management system.

WITH A UNIQUE PERSPECTIVE.

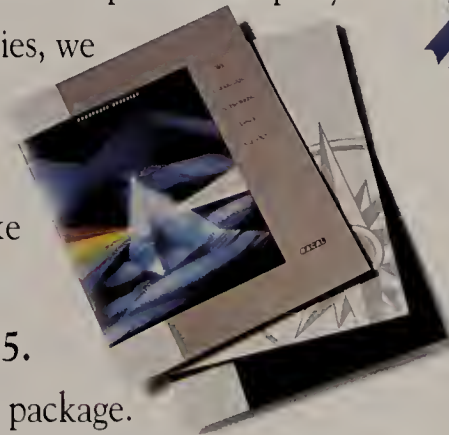
What's more, our networking experts are in the field looking after your network — wherever it may be. We're your full-time, full-service, fool-proof networking partner. With everything under one roof. That's important. Because with Racal-Datacom, you'll have a single point of contact for your networking needs. You won't have the hassle — or the cost — of dealing with dozens of suppliers.

RACAL-DATACOM.

We'll help you build a network that supports your company's business vision. We'll design, integrate, and maintain your network. If you prefer, we'll even operate it for you.

You can count on our support just about anywhere in the world. With the wherewithal of a \$2.8 billion parent company and operations in more than 80 countries, we truly are a global networking company.

To see how we've helped companies like yours achieve their unique networking objectives, call us at 1-800-RACAL-55. We'll send you a complete information package. It could give you a whole new perspective on networking.



NETWORK
INTEGRATION



FRAME RELAY
SYSTEMS



NETWORK
ASSURANCE



CUSTOMER
TRAINING



HUBS, BRIDGES,
ROUTERS

1-800
RACAL
55



HERE'S OUR UNIQUE PERSPECTIVE



**RACAL-DATACOM PRODUCTS
AND SYSTEMS:
UNDER COMMON NETWORK
MANAGEMENT AND SUPPORTED BY
WORLDWIDE NETWORK SERVICES.**

LOCAL AREA NETWORKING

- Network interface cards
- Ethernet and token ring hubs
- Fiber premises distribution systems

INTERNETWORKING

- Ethernet and token ring concentrators
- Bridges and routers
- Protocol conversion switches
- Frame relay systems

WIDE AREA NETWORKING

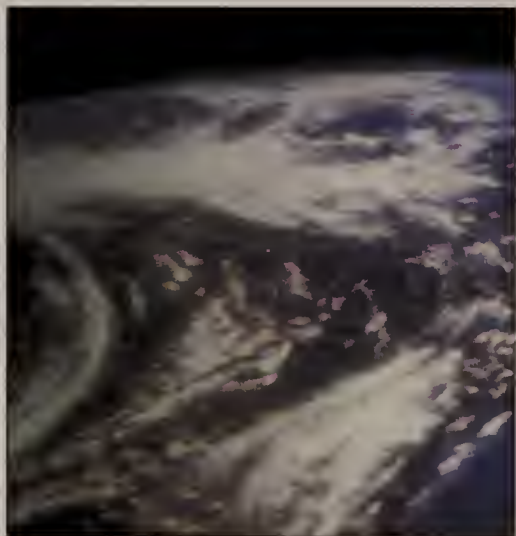
- Dial and leased line modems
- DSUs and CSUs
- T1, E1, and statistical multiplexers
- Packet switches
- Data encryptors
- Bandwidth managers
- Hybrid network systems

NETWORK SERVICES

- Consultation
- Implementation
- Training
- Network integration
- Network assurance
- Network operations
- Technical support

GLOBAL LOCATIONS

- Belgium
- France
- Germany
- Hong Kong
- Italy
- New Zealand
- Singapore
- The Netherlands
- United Kingdom
- United States
- Distribution in More Than 80 Countries



LAN-TO-LAN

NETWORK
MANAGEMENT

LAN-TO-WAN

NETWORK
INTEGRATIONFRAME RELAY
SYSTEMSNETWORK
ASSURANCE

THE Outsourcing CONFERENCE

Opportunities, Strategies, Realities

Boston • December 2-3, 1992

Conference Chairman Dale Kutnick

***THIS CONFERENCE ANSWERS YOUR CRITICAL
QUESTIONS ABOUT OUTSOURCING!***

***Gain valuable insights from over 20 of the most
authoritative sources including...***

- ▶ Dale Kutnick, *President and Research Director, META Group*
- ▶ Mark Levin, *Principal, KPMG Peat Marwick*
- ▶ Charles Oliver, *Director, Eastman Kodak*
- ▶ Robert Zahler, *Partner, Shaw, Pittman, Potts & Towbridge*
- ▶ Dave Henri, *Vice President, California Federal Bank*
- ▶ Rita Terdiman, *Director, Gartner Group*
- ▶ Dr. Howard Frank, *President, Howard Frank & Associates*

Get answers to these Outsourcing issues:

- ▶ The pros and cons of outsourcing
- ▶ How to selectively outsource portions of your network without losing corporate control
- ▶ What to look for when choosing an outsourcing partner
- ▶ How to evaluate outsourcing proposals
- ▶ And much, much more!!

***Network with over 250 other high level executives and get to the
bottom of today's business challenges!***

*Don't miss out! Call DCI today at (508) 470-3880 to register or receive a complete
brochure detailing why you must attend The Outsourcing Conference.*

EXCLUSIVE!

**FREE
Conference
Directory**

All attendees of the
conference receive a Free
Conference Directory of
other attendees to
optimize networking
opportunities.

Sponsored by



Co-sponsored by

Ziff Information Services

Litton
Computer Services

Also participating: **Financial Technologies, Inc.**



digital

CORPORATE
SOFTWARE

The
Genix
Group



A1X0JF

Only NCR Is Putt



ing It All Together.

Open, Cooperative Computing Offers The World's Most Complete Open Computing Solutions.

NCR has emerged as the leading supplier of a new way of computing. Offering performance enhancements and cost efficiencies superior by an order of magnitude to conventional mainframe-centered solutions. Designed to help your organization respond quickly to the challenges and opportunities of increasingly competitive world markets.



No one is delivering more complete, and powerful, open systems solutions. A new generation of mobile computers with advanced networking built in. Pen-based systems.



The NCR System 3000 Family is the most complete end-to-end open systems offering in the world.

A full line of personal computers. Massively-parallel enterprise servers far surpassing traditional mainframes in power. NCR COOPERATION®—an innovative suite of enterprise integration software designed to help you re-engineer your business processes for greater efficiency. And the



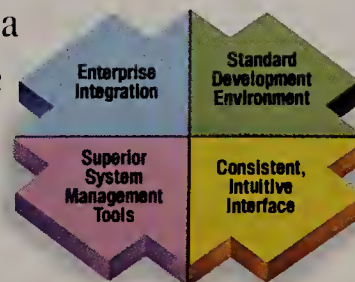
Our Open Networking Environment includes the most advanced networking and network management products available.

world's most comprehensive set of networking and connectivity products.

And that's just for starters. Our access to the world-famous R&D facilities of AT&T Bell Labs and the advanced parallel-processing technology of our Teradata organization will ensure that we maintain the lead in open enterprise computing solutions.

We have the people, the products, and the financial stability to provide you with powerful, cost-effective computing solutions worldwide. We're putting it all together for a growing number of forward-thinking organizations. We can do the same for you.

For a free brochure—"How To Build Truly Open, Enterprise-Wide Computing," phone 1-800-CALL NCR.



NCR COOPERATION is fast becoming the leading choice in enterprise integration software.



Open, Cooperative Computing.
The Strategy For Managing Change.

TRENDLINES

MINDING THE FLEET

IT gurus have long argued that companies should look to information for new business opportunities. A case in point: In 1985, A.R. Wright, an oil company based in Portland, Maine, spun off a little information venture that had been cooking on an in-house back burner since 1983.

The idea was to create a new service product for commercial car and truck fleets. After some revision of the original idea, here's how it works today:

Drivers of corporate fleet vehicles pull into a gas station, fill the tank and put the tab on a Wright Express credit card. Unlike traditional cards, Wright Express's plastic captures detailed information about the purchase. Fleet managers receive monthly reports on each driver's transactions—including date, time, place, products or services purchased, price-per-gallon, cost-per-mile and so on. They can even get summary reports by department.

The cards eliminate the need to match receipts to drivers and vehicles, and they cut down on unauthorized purchases. Fleet managers pay a monthly charge for the service.

Approximately 50,000 gas stations and service centers across the nation honor the card. (Retailers must use a computer to complete transactions on their end.) Wright Express sells other information products as well, including electronic vehicle-analysis-reports software, and an electronic payment system. The company also provides processing, management and marketing services for other fleet cards. ■

LEGAL ISSUES

THE PITFALLS OF PRIVACY

IT offers powerful tools to marketers, but marketers who use them too successfully or carelessly may incur legal action. A new report from the non-profit Marketing Science Institute of Cambridge, Mass., examines some of the ways marketers looking for cold cash may find themselves in hot water.

Privacy issues should be marketers' biggest concern, the report says, as companies risk running afoul of a growing number of state laws restricting the acquisition and disclosure of information. A Pennsylvania anti-wiretap law has been used to block the introduction of caller ID; California requires companies selling "bad tenant" lists to notify people who are includ-

ed and allow them to correct information in their files.

Federal statutes, meanwhile, can affect whole industries, such as cable companies, credit bureaus and videotape rental companies. Businesses that pass along inaccurate information may be setting themselves up for product liability and libel suits, or for charges that they violated statutes such as the Fair Credit Reporting Act. In a 1985 Supreme Court case, *Dun & Bradstreet v. Greenmoss Builders*, a company was found to have been libeled by an erroneous credit report.

Some marketing systems may also put companies at risk of violating antitrust statutes. The Justice Department may consider systems that provide current data on competitors' prices, marketing tactics and customer bases as evidence of a collusive agreement or illegal price-signalling among competitors. That was the case when it charged that the airline industry was using its Airline Tariff Publishing information system to collude on prices.

Another danger is that the courts may rule that some systems must be shared with competitors—as in the 1983 decision granting MCI access to AT&T's local telephone lines. Companies that have created reservation systems, credit-checking systems, automatic teller systems and automatic order-entry systems could conceivably be sued by competitors for failing to provide access to "essential facilities."

The 21-page study, entitled "A Framework for Identifying Legal and Political Risks of Using New Information Technologies to Support Marketing Programs," was written by members of the marketing and legal studies faculty at the Kenan-Flagler Business School of the University of North Carolina at Chapel Hill. ■

ARBOR DAY GREETINGS TO A SUPER THIRD COUSIN

Your yoga teacher has just informed you that she's canceling the rest of your classes because she's been invited to study with the Dalai Lama in Tibet.

You're happy for her, you're sad to see her go, and you want a refund. Where will you find a greeting card appropriate to such a situation?

In an unusual marriage of technology and sentiment, American Greetings Corp. of Cleveland has launched CreataCard, a computer system that allows card buyers to create customized messages right in the store. Using a touch screen, shoppers choose from about 1,000 base designs and then customize the card by typing in specific data (date of birth, type of ill-

ness) and a personal message if they wish. Users can designate occasion (birthday, bereavement), who the card is being sent to (friend, family member) and the

style of card (juvenile, sexy, off-beat).

The system prints the card in less than three and a half minutes on cream-colored paper. The cost, including envelope, is \$3.50.

American Greetings is rolling out several thousand kiosks to drug, card and specialty stores throughout the United States and Canada. The company says it expects sales of \$25 million to \$35 million during the first year of operation, and annual revenues could reach \$500 million. ■





The Navy Brought Us Aboard!

*And so did 40 of the
FORTUNE Top 50.*

The diversity among the world's largest companies belies a common concern that led 40 of them to *one* company . . . for one reason — unique connectivity solutions that leverage a most important asset: information.

Glasnost For The Glass House.

These companies recognized the value of information early on. They invested in IBM mainframes and SNA environments at headquarters and later built TCP/IP LANs to link other locations. As a result, they created huge repositories of information in their home offices, nimble networks in the field — and a frustrating inability to connect the two. Which is why they connected with us.

Access. Synthesis. Interoperability.

Our technology transforms these separate networks into seamless systems. So users the world over can easily access information in the mainframe, in a form synthesized to look like what they're used to. Which means they can actually *use* the information — massage it, manipulate it, integrate it — without compromising the integrity of your corporate database *or* your control over it!

Open Your World Without Closing Your Options.

Others debate standards, we deliver benefits. So if disparate systems have you looking at open systems, look to us . . . and enjoy the ultimate management option: to embrace new technology *without* risking past investments!

*To Learn More, Call Now.
(214) 484-5200.*

OpenConnect Systems
2711 LBJ Freeway
Dallas, TX 75234

OPENCONNECT

S Y S T E M S

Transforming Separate Networks Into Seamless Systems.



Recently the analysts looked into our UNIX strategy and discovered what sets us apart.

Vision.

The view of industry observers is clear—Unisys has strongly positioned itself as a leading provider of UNIX offerings for the years ahead.

Early on, we saw that an Intel-based UNIX system would protect a customer's existing investment in Intel-compatible peripherals.

A recent AIM Benchmark demonstrates that performance of the

Unisys Intel-based UNIX system is more than equal to that of any RISC-based system.

And because we have unique experience with the entire range of UNIX from desktop to mainframe, Unisys is unsurpassed at fully inte-

UNISYS

We make it happen.

InfoCorp
UNISYS:
UNIX STRATEGY
ON TRACK

"Unisys has a cleanly stated UNIX strategy, a well-designed and competitively priced Intel-based UNIX offering, and an interesting suite of networking and applications development tools."

grating UNIX systems throughout an enterprise.

All of which brings Unisys the recognition of today's information technology industry. And helps our customers bring their business objectives within sight.

Supporting Players

Coalitions of similar networking companies are helping to fill the most gaping holes in enterprisewide coverage

BY JACK MARTIN

No one would consider buying a mainframe without investigating the fine print of ongoing support—from training to on-site repair and provisions for upgrades. But most companies installing LANs still consider support a secondary issue. That's their first mistake.

It is extremely difficult to manage large networks effectively, particularly if remote locations are scattered far and wide. Many companies select the path of least resistance by farming out the work to unfamiliar subcontractors or contractors known only to a local office. That's their second mistake.

Defining the right strategy for network support can significantly affect how well the technology performs and whether it meets the company's business objectives. Implementing this strategy requires that CIOs identify the weaknesses in their current support program and evaluate the services that might improve it.

Today's predominant network-management styles fall into three philosophical camps. Each reflects the or-

ganizational maturity and corporate culture of its proponents and entails hard-to-avoid compromises in overall performance. The three camps may be characterized as follows:

Rampant Independence: Each local office is encouraged to operate its network independently. Network managers in these outposts are responsible for their own training and support, and often for their own technical standards. The problem: Local goals may conflict with corporate objectives and interoperability.

Monolithic Control: Some companies assume that because the network is a critical resource, it should be managed by a single organization—namely, the vendor. The bigger the name, the better; those with three letters are preferred. The problem: The client rarely understands that local management is performed by subcontractors, who may have dramatically different procedures.

Look, Then Leap: CIOs at these companies have been through the pilot LANs and recognize that the real work begins after installation. They know it is essential that comprehensive, quality network management be available at every location. The problem: A few of these companies may postpone installation until support is assured.

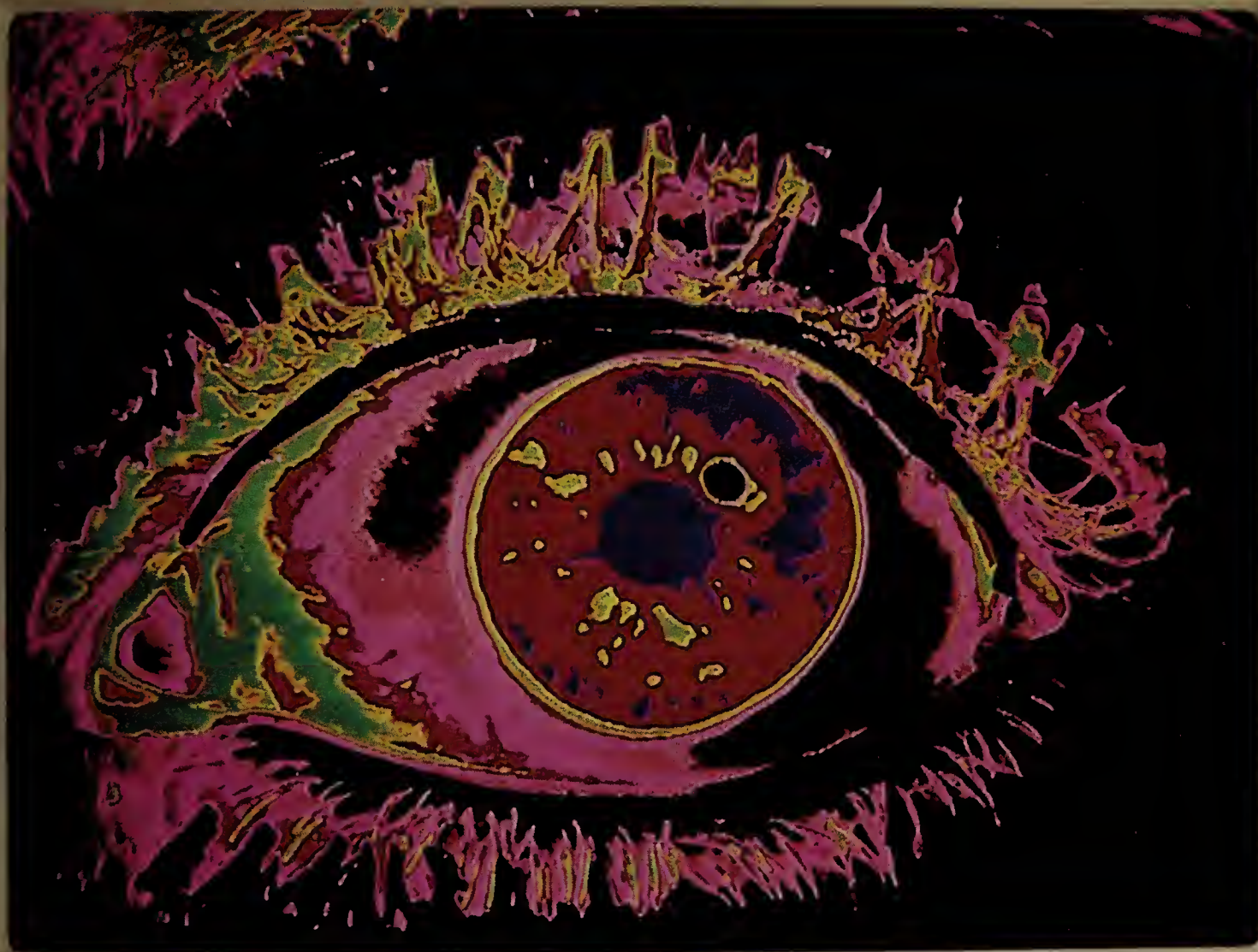
While support alone can't solve all the CIO's strategic woes, it can help—by providing consistent objectives, tools for centralized control and adequate training for non-technical professionals who get stuck managing the majority of local segments.

To date, CIOs have had only these three options for achieving enterprisewide coverage. Each leaves the IS staff grappling with a confusing array of administrative details and the unwelcome task of simultaneously managing dozens of projects.

But a new type of networking or-



Now you can transmit the blink of an eye in the blink of an eye.

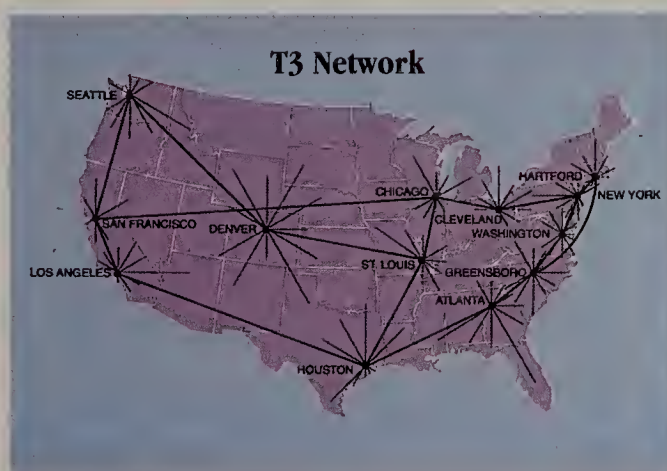


Introducing the ANS Network: Nationwide T3 transmission for commercial use!

The public T3 ANS Network is ready to transport commercial traffic at super high speeds (45Mb/sec). Your company can now attach to the Internet at a range of speeds and transmit massive amounts of data — anywhere in the country — *literally* in the blink of an eye.

Super high-speed data transmission on our TCP/IP, OSI network makes intra-company communications ultra efficient, letting you accomplish in seconds or minutes what used to take hours or days.

The ANS Network gives you instant access to the latest information in hundreds of databases available on the Internet. Medical images, geological surveys, market trends, CAD/CAM images, economic statistics, patent



files—you name it—can be directly available to keep your business on the competitive edge.

What about security for your network and your data? ANS CO+RE offers InterLockSM security service.

What about start-up and costs?

ANS CO+RE can help with the planning, equipment selection, installation, and personnel training your company needs to get up and running. And we can connect you to our network at one or more points across the country. Since we designed the ANS Network, no one knows better than we do how to help you hook into the nation's fastest commercial TCP/IP, OSI network and hold down costs.

To get an eyeful of what high-speed data networking is all about, and how your company can tie into the ANS Network, call 1-800-456-8267. Or write: ANS CO+RE Systems, Inc., 100 Clearbrook Road, Elmsford, NY 10523.

ans
ANS CO+RE Systems, Inc.

ganization is filling some of the most gaping holes, particularly in WAN support. These enterprises bring together similar networking companies to provide national and international coverage. Some are affiliations of companies that retain their independence; others are acquired by a titular parent company; still others blend their services and technical expertise to provide corporate customers with a single point of contact and consistent service. Some of these enterprises have grown up with the PC and have recently migrated toward networking. Others have their roots in host-based data processing and understand the issues and architectures of wide area networking.

These companies vary widely in size, from billion-dollar players like EDS and Andersen Consulting to smaller regional organizations like Evernet Systems Inc. in Los Angeles, USConnect in New York and my own organization, The Asset Group in Houston. The leading players in this latter group have hundreds of employees, revenues of more than \$50 million and annual growth rates in excess of 25 percent.

While many CIOs are intrigued by the prospect of national and international network management, surprisingly, many leave this critical business decision to their technical staffs. But the engineer who can swap a server card with his eyes closed may not understand the more subtle business implications of uneven network coverage. Steadily degrading performance is only the most superficial failing. More substantial is the server that crashes for a day, or a week, because no one detected a worsening problem. In a global environment, a local error could paralyze the entire network.

Dealing with a networking organization comprising multiple companies raises other issues. Can companies that are also potential competitors cooperate? (Yes, when they share a common goal of expanding their national market.) Will the customer get caught in internal disputes? (Disputes can arise between local offices of a large entity as well. They're resolved by the local office

or, if necessary, headquarters. Networking organizations should have similar procedures in place.)

Hundreds of these networking firms will swear they understand the requirements of maintaining complex networks. The most advanced prove it on a regular basis. They design their services for 24-hour availabil-

National networking firms will work with the CIO's staff to design a management scheme that addresses control, security and inventory.

ity—with on-site support, "hot" spares of fully configured servers and even 24-hour technical support. They'll provide extensive training to ensure that every network manager acquires a consistent set of skills. And they'll ensure that all of their policies and procedures are absolutely consistent, from headquarters down to the smallest branch office.

They'll also understand the requirements of large corporate customers, working from a single purchase order and providing clients with a single point of administrative contact. And of course they'll offer local offices a local contact, if that's what the client prefers.

Most importantly, they'll work with the CIO's staff to design a management scheme that addresses three critical areas: control, security and inventory. They'll provide remote notification of trouble, diagnostics and repair, from the client's central IS office location and their own. This means that the "local network manager," whose real job may be helping to manage a bank branch, won't be asked to climb under desks to flip dip-switch settings.

But companies shouldn't just assume that a national or international networking firm can solve all their

problems. CIOs must ask some tough questions—first of their own staff, and then of the companies they might consider hiring. Does the network have a clear mission? What is the role of local control? Can end users at remote locations manage their segment or do they need professional help? Would providing them with a consistent source of technical training be sufficient?

CIOs who are convinced that an outside firm will do the job more efficiently have other issues to consider. The most important is to ensure that all offices have similarly high levels of technical proficiency. Others include:

Experience: How long has the network integrator specialized in networks? Does it understand the prospective client's topology? Can it provide reference accounts with a similar environment? Is it accustomed to working with national accounts?

Coverage: Is it conveniently located? Will it provide 24-hour coverage? On-site? Via beeper, or with a fully staffed technical center?

Stability: Is it profitable? How fast is it expanding, and how much will expansion affect local operations? If the organization consists of multiple companies, have all the original members remained? If not, why?

Support Services: Does it offer hotline support and remote network management from its locations? Does it use innovative technologies to help clients stay ahead of the technology? Does it offer vendor-certified training? Where?

While no approach is foolproof, asking the right questions will help a CIO determine whether this new breed of networking organization can assume critical management tasks.

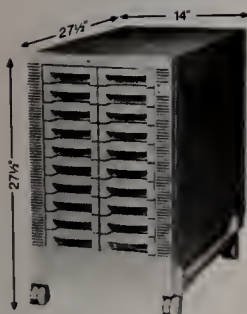
If the partnership is successful, the CIO will be able to hand over routine network management while retaining strategic control. The change can't come a moment too soon, because as some CIOs have already seen, a network that doesn't work isn't much of a network. ☐

Jack Martin is executive vice president of The Asset Group, a nationwide network integration organization based in Houston.

Dear IBM,
SUN, HP,
UNISYS and
ICL user,
CLARiiONTM

OPEN
STORAGE
SYSTEMS

will blow
you away!



24 BILLION BYTES
IN 2.7 SQ. FT!

CLARiiON from Data General—the faster, smaller, UNIX[®] open storage systems that connect to IBM, SUN, HP, UNISYS and ICL for a price that's music to your ears!

Computer companies everywhere have been making a lot of noise lately about UNIX[®] open storage systems. The problem is that's all they've been making—noise! At Data General, we've gone quietly about our business and have actually created remarkable open storage systems called CLARiiON. And CLARiiON is one call everyone should heed because CLARiiON connects to the UNIX systems-based IBM RS/6000, SUN SPARCserver 600 series, HP 9000-800 series, UNISYS U6000 series and ICL DRS 6000. Its RAID technology vastly increases the storage capacity and high availability of these systems. And CLARiiON does it all for a price that's so low it will fit right in with the rhythm of your budget. So if you want uninterrupted data access, data loss protection, low-cost data redundancy and increased disk performance, all of which you can maintain yourself, think CLARiiON and call 1-800-DATAGEN



Data General

Where the World
is going!

THE POWER OF POSITIVE

The decision to downsize is anything but clear-cut. Done correctly, downsizing can pay off handsomely, but an ill-considered effort may spell disaster. The stakes are high and the clock is ticking....

BY RICHARD PASTORE



Three months; six, max. That's all the time allotted to weighing a course of action that could cost an organization millions. Or save it from antiquation and extinction. The decision to downsize systems is best made quickly—inside six months, experts say—before shifting business requirements obliterate earlier assumptions. Within that span, organizations must weigh the cultural, economic and technical concerns affecting the whether-to and how-to of downsizing. Sound reasoning will create a road map that points the way to a cost-effective computing environment. Faulty reasoning that overlooks even a few key considerations will lay the groundwork for downsizing disaster.

By necessity, the window for decision-making is a narrow one. "The company will fail if it spends a year and a half coming up with a five-year downsizing plan," maintained Larry DeBoever, managing director of consultancy Tucker/De-

Boever Network Technologies in South Norwalk, Conn. Ideally, the strategic analysis should be completed within a few months, before changes in technology and business needs render previous conclusions obsolete. Though the span seems unreasonably short for such a weighty decision, most downsizing veterans interviewed for this article finished within that time frame, some pounding out strategic plans in as little as 30 days.

Several factors commonly weigh in the decision to migrate to distributed, small-platform architectures: expected return on investment, application suitability, the need to reengineer work processes and the state of internal skills. But there is no easy-to-follow recipe to determine if downsizing is the right course. As the case studies starting on Page 32 indicate, each organization must find its own path to the land of small-platform computing.

The most common downsizing consideration is anticipated ROI. It also happens to be one of the trickiest to pin down—and the

likeliest to go awry. Companies often overlook nontechnical factors that wind up siphoning off expected savings. In fact, "nontechnical costs can dwarf the costs of the systems," said Allan Levy, vice president of technology services at downsizing consultancy International Systems Services Corp. in Stamford, Conn. One cost often overlooked is the expense of reengineering work processes or retraining users upon whom the new systems will have an impact. For example, downsizing often delivers new powers into the hands of end users, a good thing in itself. But these users will require retraining to properly wield their new powers.

The technology itself, particularly its limitations, is the most obvious downsizing concern. While the situation is continually improving, small-platform software and operating systems still can't match the robustness and management functionality of the mainframe environment, noted David Flint, managing associate at consulting firm CSC/Index Inc., based in Cambridge, Mass. CIOs wanting to press ahead must gamble that the functionality of client/server software will have evolved sufficiently



ILLUSTRATION BY HAL MAYFORTH

to support their systems needs by the time they are ready to implement.

Another technical consideration is whether the firm's target applications are suitable for small, distributed platforms (see "Thinking of Downsizing?" *CIO*, July 1991). For example, if you try to distribute a corporate database across a downsized platform, you risk building an inflexible system and a

by several member corporations. Omicron, a Mountain Lakes, N.J.-based IS consortium, also offers members discounted IS training in distributed environments. To expedite the process, companies should also consider outsourcing their mainframe maintenance, relieving staff to immerse themselves in the new platforms. Any savings generated by outsourcing could help fund the new system.

Companies often overlook nontechnical factors that wind up siphoning off expected savings.

management nightmare, according to Flint. "People have to understand technical points like database usage to make the right decision on downsizing," he said. Many will opt for a hybrid plan, frequently called rightsizing, in which the mainframe sticks around to run applications unsuitable for smaller environments.

Personnel issues are a common concern, too. Companies contemplating downsizing are often top-heavy with mainframe jockeys and Cobol programmers who must be retrained. At Home Insurance, internal IS skills failed to keep pace with a two-year push to convert from a mainframe IMS Cobol environment to an IBM AS/400 and multiple LAN architecture. "Once our momentum developed, our requirements [unexpectedly] exceeded our ability to develop staff to support our needs," said Thomas Gaughan, senior vice president and CIO at the New York-based firm. Gaughan has had to rely on outside IS contractors to fill the gaps, but his goal remains to become self-sufficient in the downsized platforms.

Thankfully there are ways to speed up IS retraining and reduce its cost. Members of regional CIO professional societies, such as the Chicago Research and Planning Group, have access to lower-cost downsizing training cosponsored

While issues like staff retraining should play a part in any downsizing decision, different companies will generally have to weigh problems and concerns peculiar to their own business. To illuminate these specific concerns and how some companies have approached them, we present the following case studies from a mortgage lender, a city government, an overseas banking institution and a diversified manufacturer.

FIRSTLINE TRUST

Toronto

At FirstLine Trust, a bank specializing in mortgage lending, users had hit a wall in the shape of a cranky, inflexible banking software system running on a Digital Equipment Corp. VAX. The PC-literate bunch did their best to work around it, designing their own PC routines and ignoring the dumb terminals on their desks. When the company's president got wind of it, he was furious—with the system, not the users.

"The user base was the only thing we had that was working right," said Brendan Calder, presi-

dent of the \$4 billion (Canadian) firm, which has ballooned from a \$100 million entity eight years ago. "We needed a system to keep up with our people and our growth as a company."

The decision to change was simple; figuring out how was the problem. The first logical step was to hire a CIO, since FirstLine had no IS staff to speak of. Calder recruited Janet Wilson to fill the new post of vice president of IT and deliberately placed her on equal footing with the other eight executives who ran the business.

In January 1990, after a few months screening vendors, Wilson installed Richmond, British Columbia-based Prologic's Relational Banking System and 4GL on newly networked PCs. Today 15 major functions have been converted or developed for the PC-based environment, and the VAX is due to be unplugged within 12 months.

Unfortunately, the transition period was anything but smooth. "I was like a kid in a candy store," admitted Calder, whose impatient Teddy Roosevelt charge into downsizing led to a few false starts. Too many projects were begun too soon. "We reached a low point a year after we started, when it looked like we weren't going to get anything finished," he said. With few results to show for the money spent, the company began to get cold feet.

FirstLine spent several months revisiting its downsizing decision. Finally, the bank refocused on its primary objective: building a flexible banking system. "That meant saying no to some projects and reworking others to get things finished," Wilson said. To keep everything business-focused, FirstLine created business-analyst positions within each functional area, filled by users to help manage IS-user communications.

Though the process is currently on track, the earlier problems have taken their toll: Productivity benchmarks have climbed, but not

as fast as the firm had hoped. But overall, the FirstLine executives still feel downsizing was the best way to keep pace with their enterprising end users.

CITY OF SAN ANTONIO

Texas

The public sector has a unique set of concerns when it comes to downsizing including reams of red tape and legislative constraints. But perhaps the most critical is IS salaries. They are so low that it is difficult to retain staff long enough to justify the expense of retraining. The City of San Antonio wanted to downsize, but it couldn't afford to educate its 40 programmers in a new environment only to have them quit soon after.

The solution, dreamed up during the decision phase, was to modify the city's current development tools so that applications programmed on the mainframe would run on a downsized platform. That way, the city could preserve and leverage its programmers' existing skills with little or no retraining. To pull this off, San Antonio prevailed upon its current vendor, Software AG of North America Inc., to port its IBM MVS-based fourth-generation development language and database to the AT&T brand of Unix.

The first application developed with the modified tools was San Antonio's most critical: a police, fire and ambulance dispatch system. Centrally located in the city's only data center, the original mainframe application was vulnerable to disaster. The need to build a redundant backup was what got San Antonio thinking about downsizing in the first place, according to Director of Information Services Frank Stromboe.

Get Ready... Get Set...

Companies planning to downsize must frequently work fast, but they can't afford to sacrifice intelligent preparation.

Larry DeBoever, managing director of consultancy Tucker/DeBoever Network Technologies in South Norwalk, Conn., proposes some rules that can help pave the way to a smoother transition.

- ▶ **Do not upgrade your mainframe—no matter what.**
- ▶ **Somewhere in your company are some IS staff doing client/server—find them.**
- ▶ **Get expert help for quick preparations such as deploying middleware and determining database-sharing requirements.**
- ▶ **Do not hire a major consulting firm to develop a long-range plan.**
- ▶ **Analyze the fully loaded cost of all existing applications.**
- ▶ **Do a hands-on inventory of every computing platform and network connection.**
- ▶ **Do not buy another dumb terminal—buy '386-based PCs.**
- ▶ **Do not install any unshielded twisted-pair wiring other than highest-performance Data Grade 5.**
- ▶ **If you have LANs, do not buy another bridge.**

Again the city partnered with Software AG, this time to codevelop a new dispatch system. Though programmed on the city's Amdahl Corp. mainframe, the application runs live on Unix-based servers from Pyramid Technology Corp. networked by AT&T's StarLan to 53 PCs. For redundancy's sake, the new dispatch application also resides on the Amdahl machine, but in a dormant state. The whole process took about one and a half years and has helped San Antonio trim mainframe resource use by 30 percent, Stromboe said.

While partnering with Software AG helped Stromboe solve his training dilemma, he hasn't placed his group at the mercy of the vendor. "I wanted my staff involved in the programming with Software AG," said Stromboe, who made sure development teams included both vendor and city employees. That way, "we know how the system works, how to maintain it and

how to change it." As icing on the cake, the city will get a cut of the royalties should Software AG choose to resell the dispatch application.

HFC BANK PLC.

Windsor, England

This British bank made its downsizing decision four years ago, when an IBM 4381-based banking system gave up the ghost. The system was of so little value that there was no temptation to try to preserve it. That made the choice to "rightsize" to an IBM AS/400 easier, said John Hogan, director of bank information technology. The AS/400 got the nod mainly because the best banking

Open In



Invitation

Or, How National ISDN Can Open A New Era Of Communications For You.

The benefits of a new digital public network, National ISDN, will soon be made available to you by your local telephone company and AT&T. Using our technology, the telcos already offer central office based solutions like advanced voice services, PC screen sharing and image communications. National ISDN represents an industry-wide agreement to digitize the public network based on open standards, so you'll soon be able to get the same high quality service wherever you're located. If you're evaluating your current network or forecasting capital investment, it makes more sense than ever to talk to your local telephone company. And find how much more they can do for you.

*AT&T and Your Local Phone Company
Technologies For The Real World.*

**AT&T****Network Systems**

system HFC could find, Fiserve Inc.'s CBS, required that particular minicomputer.

While considering platform and software changes, HFC saw an opportunity to automate several manual bank functions at the same time. That decision, in turn,

three years at HFC. The project concluded one year ago. But the legacy of the business-leader appointments remains. Hogan now insists on using that approach for all information systems projects, even those confined primarily to the information technology infras-

with which it could be accessed.

Shiels formed a team that immediately set out to canvass the company's 11 divisions, sounding out managers on the system functionality they desired and the level of responsibility they would willingly accept.

Then it came time to screen vendors. The hardware and network choices: IBM's Unix-based RS/6000 workstation and Novell Inc.'s Netware, respectively. For software, Shiels preferred packages to internal development.

"They're quicker, cheaper, and I didn't want to reinvent the wheel," he said. Rather than taking any vendor's word on a product's efficacy, Shiels also checked customer references. "We found out about problems [other users had] run into and the pitfalls of Unix," he said.

Just as important, downsizing veterans warned that IS-staff consensus would be impossible to achieve. Unanimity was easy to come by in the mainframe world, where IBM set the standard. But in the downsized world a plethora of products and multicolored operating systems can pull an IS staff in a dozen different directions. "We had to make a choice, close ranks and move forward," Shiels said. "Otherwise, we'd never finish the job."

The company also relied heavily on consultants at the Gartner Group in Stamford, Conn., and Forrester Research Inc. in Cambridge, Mass. "Two or three times their information saved us from making very serious mistakes in our vendor choices," Shiels said.

Huber took delivery of its first workstations last summer. This month, the company will hand over mainframe processing to an outsourcer, freeing IS to focus on the new systems. And in three or four years, when the transition is complete, Shiels said, the new architecture will have paid for itself and will be delivering more value than the mainframe at less than 80 percent of the cost. ☐

Many companies will opt for a hybrid plan, frequently called rightsizing, in which the mainframe sticks around to run applications unsuitable for smaller environments.

meant that the bank's work processes would surely be altered or eliminated entirely. What might have been a mere downsizing project mushroomed into a full business metamorphosis and the biggest single technology-related project the company had ever undertaken.

It was pretty clear to Hogan early on that the scope of the project was too great for the IS department alone. So the company appointed full-time project leaders from the user community, a first for the bank. A director-level business user would oversee the entire project, briefing a corporate review board on a monthly basis. Other senior-level users would be devoted full-time to the endeavor.

The preparation paid off. Because users were directly responsible for the project, the business buy-in was tremendous, Hogan said. Obstacles that might have derailed a project sponsored by IS alone were quickly cleared away. For example, Hogan needed to make a change in salary scales in order to entice new hires with AS/400 expertise. "Without senior-management commitment, we could not have touched those salary scales," Hogan contended. Companies contemplating downsizing should keep in mind from the start that it's a business project, not a technology project, he said.

Overall, downsizing consumed

structure. "I don't allocate resources to a project unless the business first supplies a project leader," he said.

J.M. HUBER CORP.

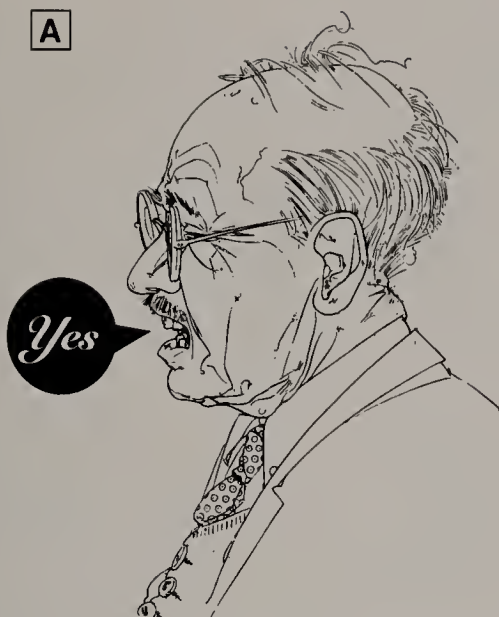
Edison, N.J.

When the decision to downsize is strategic and enterprisewide, and when the mainframe is slated for the scrap heap, the worst thing a company can do is plan the migration in a vacuum. With that in mind, billion-dollar diversified natural resources and chemicals manufacturer J.M. Huber began an intensive six-month quest for information, consulting with its own users and quizzing downsizing vendors and battle-scarred veterans alike.

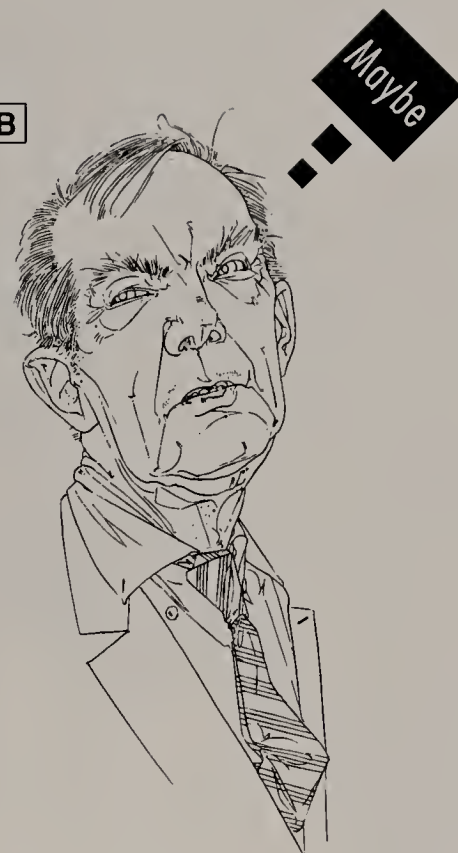
Corporate management sparked the process when it questioned the value of its own IS organization and hired CIO John Shiels to shake things up. Shiels did just that, declining IBM's invitation to upgrade the 3090 mainframe and instead pushing for total systems downsizing and distributed processing. The goal was to make users the owners of the data and increase the flexibility and ease

Can your company stay in business
without business re-engineering?

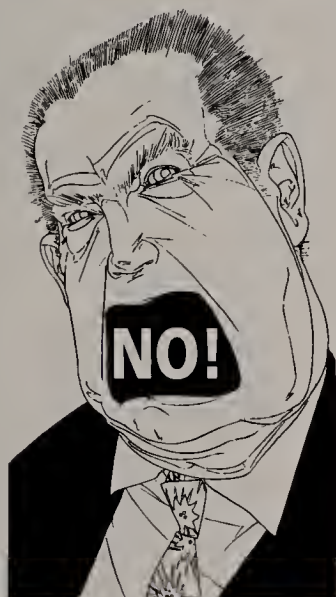
A



B



C



D

I don't know
...what is it, exactly?

Most managers are trying to re-engineer their company's business to stay competitive. If you're one of them, just fax or call us and we'll send you a thought-provoking interactive disk that gets to the heart of today's information issues. Next step? We'll help you develop a plan for tomorrow's information systems. Only from D&B Software.

For **FREE** D&B Software

F A X

Desktop Diagnosis Disk.

1-800-321-6896

B A C K

Or call 1 (800) 321-6897
ext. 500

Name _____

Title/Firm _____

Address _____

Fax _____

Phone _____

A ☐ B ☐ C ☐ D ☐

D&B SOFTWARE
Dun & Bradstreet Software

DB a company of
The Dun & Bradstreet Corporation

TV'S PERFECT PITCH

BY MEGHAN O'LEARY

"THIS ITEM IS *DYING*," says Jim Brecher, vice president of network programming, as he watches the *Home Shopping Club* on a bank of television screens in his office at the company's headquarters in St. Petersburg, Fla. A few hundred feet away, a Unisys mainframe in the network control room tells a computer terminal to Brecher's left that the number of incoming calls for the product is shrinking and that sales per minute have already peaked and are heading south.

The control room is sending the same message to the host on camera, and although her spiel never wavers, she is already preparing to jettison the dead weight. Interjecting her sales patter with details about the next item, she tries to get callers revved before she makes the switch.

Home Shopping Club (HSC)'s wildly successful brand of electronic retailing is based on the impulse buy, and callers have only a few critical minutes to order the product on the screen. The host's job is to keep sales-dollars-per-minute as high as possible. As she abandons the falling product for the rising one, the host is like some wing-walker trying to leap in midair from a free-falling plane onto the wings of an ascending one. If she's lucky, the numbers will never hit the ground.

This is HSC's air ballet, the rapid yet precise real-time coordination of products, pitching and pricing that has allowed this

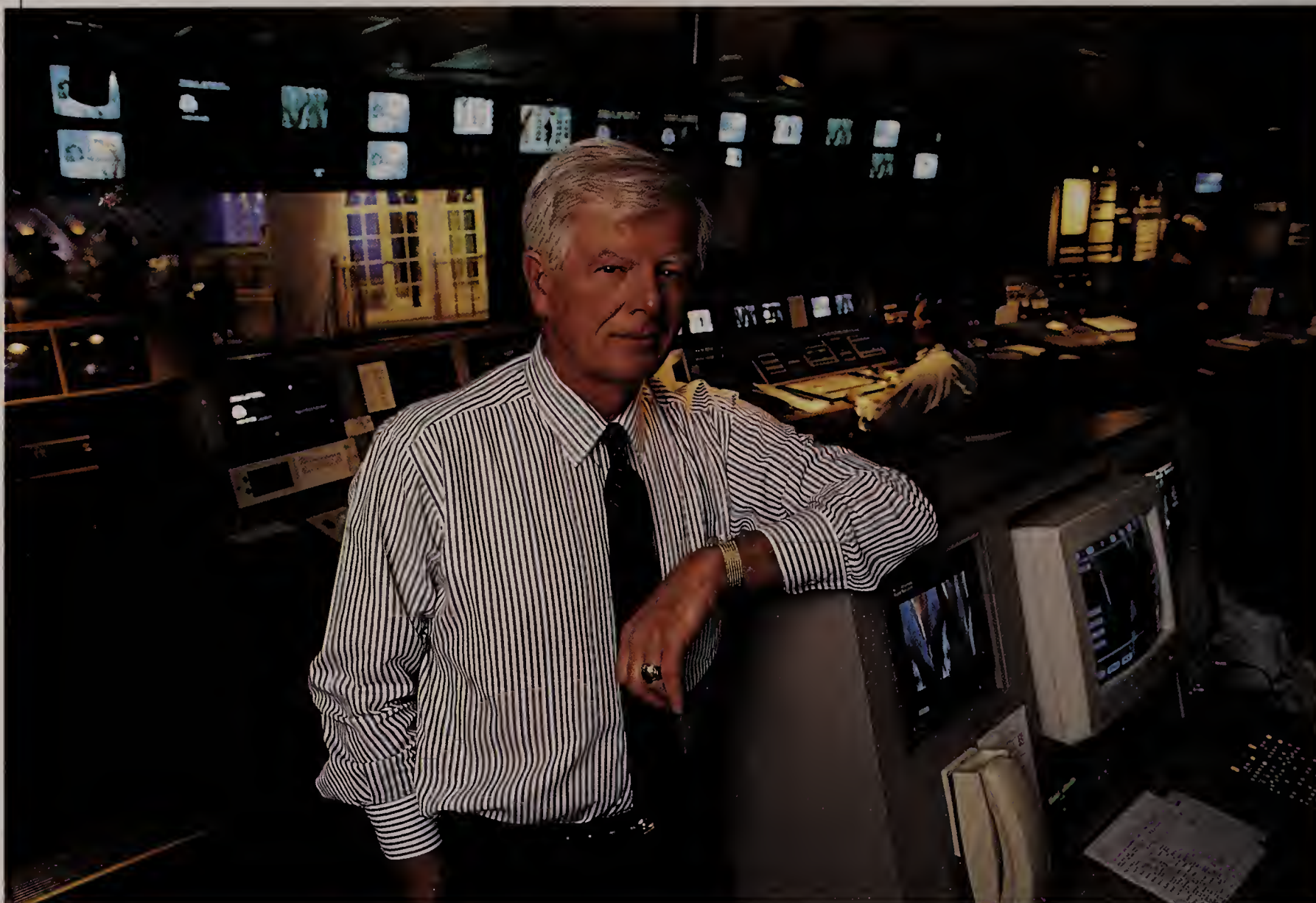
STORYLINE

The Home Shopping Network didn't need computers seven years ago when its primary business was hawking electric can openers over the radio in Florida. But now that HSN is a \$1.1 billion marketing machine, with three 24-hour cable networks handling as many as 200,000 calls a day, the company has had no choice but to automate everything.

Fortunately for Executive Vice President of MIS Stella Tavilla, the unusually close relationship of HSN's management team has made enhancing current systems and innovating new ones relatively easy. Tavilla and her management peers meet constantly, both formally and informally. As a result, there is no separation of business and IS at HSN, and Tavilla finds herself developing the whole business, not just a computer system to support it.

STELLA TAVILLA:
A dynamic, integrated IS structure helps make the orchestration of the Home Shopping Club's ceaseless activities seem a piece of cake.





JAMES LAWLESS: *HSN uses historical data to plan future shows, make buying decisions and focus marketing campaigns.*

electronic retailer's parent company, the Home Shopping Network (HSN), to grow in seven short years from a local radio hawker of electric can openers to a three-network, 72-hour-a-day, nationwide marketing machine with sales well over a billion dollars. In addition to the cable programs, HSN is parent to a host of smaller subsidiaries that provide health-care products, video production, travel arrangements and marketing services for outside customers; and insurance, mail-order services and voice-response telephone software for HSN itself.

HSN's technological capital is a tightly integrated network of telephones and computers that allows it to react to real-time information and learn from its own sales history. Driving that technology is a closely knit management team that invents daily the industry their company dominates.

What enables HSN to operate efficiently, even when the action is fast and furious, is its ability to take information about what callers are

HSN is renowned for its order entry, check and credit processing, warehousing, shipping and customer service, which keep customers calling back and products flying out the door within 48 hours of ordering.

buying and how fast and feed it instantaneously to terminals in studios, production control rooms and offices across the company, so that

show hosts and producers can make split-second decisions about products and programming. For the long term, the information is stored in databases of program, product and customer histories and used to plan future shows, make buying decisions and focus marketing campaigns. "If you know your history, you won't make the same mistake twice—hopefully," said James M. Lawless, president of HSC. "That's what we spend our time on."

"Nothing is done around here if it can't be done through the use of computers," said Stella L. Tavilla, executive vice president of MIS for HSN. Tavilla's role, "besides coming up with ideas occasionally," is making sure that other people's ideas can be implemented on HSN's network of mainframes and LANs.

HSN's computer system handled all of 200 orders on its first day as a national network. Today, with an

average of 130,000 to 200,000 calls a day to *HSC* alone, the company has no choice but to build optimally efficient systems. That standard has forced Tavilla to toe the line on automating everything.

Consider the evolution of the electronic coupon. Four years ago HSN's marketing department wanted to give members—that is, anyone who's bought from HSN at least once (that's 90 percent of the callers on a given day)—discounts on selected merchandise. Entering data from little scraps of paper was not an option. Neither was delaying the shipment of items while waiting for paper coupons to be mailed in and recorded in the order-entry system. Tavilla's staff brainstormed with marketing and came up with a solution: Numbers would appear in *HSC*'s quarterly membership magazine or on printed coupons in other magazines, and callers could key these into the phone or relay them to an operator in order to get the discounts. Today the sales department can even create real-time on-screen coupon numbers to spur sales of a slow-moving product.



JIM BRECHER creates product lineups based on historical and real-time data.

TAVILLA WORKS closely with the rest of HSN's executive management team to come up with solutions like the electronic coupon and to orchestrate the symphony of historic and real-time information that keeps HSN growing rapidly. She reports directly to CEO Roy Speer and meets monthly (and E-mails regularly) with Lawless, CFO Les R. Wandler and Vice President of Research and Analysis M. Wade Downs, as well as with the heads of marketing and operations. The real foundation of the managers' relationship, however, is the practice of stopping by one another's offices to check in, ask questions and share "what ifs."

This is the legacy of HSN's days as a small company, when managers

sometimes just yelled to each other from their offices. Tavilla and Lawless still have offices within hollering distance, but most of the management team has moved next door to the newer corporate tower on the HSN campus.

The frequent chats and more formal meetings help these managers stay focused on the future. They are constantly enhancing current systems and looking at new ways to serve customers and market products. The management team looks for opportunities to improve profitability, productivity and service without changing processes the company is happy with, while Tavilla's development and support staff of 105 does the necessary systems pro-

gramming and implementation.

As HSN's customer and product ranks have grown, Tavilla's close relationship with her peers has become essential to handling their increasingly complex requests. Seven years ago, for example, the management team tried to figure out a way to let customers order different sizes and colors of an on-screen item, thus generating more money for *HSC*. (Back then *HSC* sold only one size and color of any item at a time.) The solution had to be simple for the order-takers, and it had to accommodate the system of unnumbered items that plays on the impulsive buying habits of HSN's members. The solution they hammered out was a system that cre-

**WHAT IF ITS BRAKES WORKED
ONLY 99% OF THE TIME?**

WOULD YOU DRIVE A CAR WITH BRAKES THAT *PROBABLY* WOULDN'T FAIL? BE NO LESS CAREFUL WITH YOUR ONLINE BUSINESS SYSTEM. EVEN 1% DOWNTIME WITH YOUR CRITICAL APPLICATIONS CAN MEAN MILLIONS IN LOST REVENUES, BREAKDOWNS IN CUSTOMER SERVICE, AND SEVERAL NIGHTMARISH DAYS TRYING TO RESTORE CONTROL. STRATUS CONTINUOUSLY AVAILABLE SYSTEMS ARE DESIGNED TO BE UP AND RUNNING ALL THE TIME. THAT'S WHY DOZENS OF THE MOST RESPECTED CORPORATIONS IN AMERICA RELY ON US. FOR MORE INFORMATION ON THE SURPRISING COSTS OF COMPUTER DOWNTIME, CALL 1-800-727-3770.



Stratus[®]
We never let you down.



HSC'S WARES—*behind the scenes and on the block*

ates on the order-taker's screen a menu of items for sale. When a customer calls *HSC*, the telephone system tells the computer which of three network numbers is being used, and the computer sends the order-taker the menu of items currently on-screen on that network. The order-taker then chooses the appropriate item in the right color and size from information supplied on the screen.

IN ORDER to meet HSN's sometimes idiosyncratic needs, Tavilla's department creates a lot of original software. Ninety percent of the company's systems are written in-house. "We have bought a few PC packages," Tavilla admitted, but "our business didn't exist until we created it. We certainly weren't going to buy an off-the-shelf computer package to do it." Since HSN is such a young company, its managers and staff are also creating many new processes rather than automating existing ones, and they clearly recognize the benefits of doing things efficiently the first time.

Tavilla and her management part-

ners have created a centralized information system such that any piece of information entered into the system at any point is available to be used by other departments and subsidiaries. "We do not believe in dual data entry around here," she said.

An automated voice-response system, known as Tootie, lets members order products without the help of representatives and closes about 50 percent of *HSC*'s orders. (An experienced shopper can punch in his or her membership number and order a fast-selling item in as little as 30 seconds.) Order information is sent to HSN's four fulfillment centers across the country. HSN is renowned for its fast, efficient, seamlessly integrated order entry, check and credit processing, warehousing, shipping and customer service, which keep customers calling back and products flying out the door within 48 hours of ordering.

The fulfillment centers share information with a number of departments, including inventory (which must be able to replenish stock in a timely way) and finance (so it can update the general ledger and see how the company is doing compared to plan). The centers also keep customer service informed about which products were shipped when so that representatives can answer questions from dissatisfied customers. In addition, credit and payment information goes automatically into a customer-history database and to the finance department. (Every new system is required to tie into the company's financial systems.)

According to Tavilla, the first priority of systems should be to help users do their jobs. With this in mind, she has provided her users with decision-support and customized management-reporting tools that allow them to do analysis and create reports according to their changing priorities. Having the right tools in place means that she doesn't have to know her users' every need, Tavilla said.

Brecher relies on these reporting

tools to give him real-time graphical representations of a product's televised performance as well as historical analyses of revenues per product. He can analyze the past performance of merchandise and, together with sales and marketing, use this information to create lineups of products for the progression of three-hour shows that make up *HSC*'s programming day. Such analyses help Brecher predict how many calls a product will generate, so he can schedule slower-moving, expensive items

Customized management-reporting tools make it possible to analyze the past performance of merchandise and use this information to create lineups of products for the three-hour shows that make up *HSC*'s programming day.

like computers and diamond jewelry on one network opposite something like a designer-dress clearance on another. (Dress-buying customers are likely to overload Tootie in the rush to get their sizes, while customers spending \$1,500 are apt to take their time and may want a human operator's reassurance that the diamond ring is lovely or the computer is a great deal.)

The system also allows Wandler to show the managers of HSN's 78 subsidiaries their actual financial results compared to plan, highlighting problem areas. He can demonstrate where direct marketing campaigns have paid off financially, how much they're spending, and even how fast their phones are being answered. Before he had customizable reporting tools, Wandler could not have gotten such information to the subsidiaries in time for them to do much about it. Now he can update finan-

cials daily, and this \$1.1 billion company is able to close its books within 10 days of the close of the month.

Downs uses the system to create direct-marketing campaigns based on customer-buying patterns and then to break down the campaign results by merchandise category in order to refine and refocus them for the next campaign.

ONE REASON these managers can rely so heavily on the systems that support them is that IS involves users at every stage of a development project. "I can't ensure [usefulness]," Tavilla said. "The people that use systems every day need to ensure that, so they need to be involved in that critical portion."

From planning to implementation, every application is a joint project of all the departments it will affect, according to Tavilla. Department man-

agers sit on a development committee to provide oversight, and users work with the IS staff to determine requirements and do testing. Users also review prototype screens and reports throughout the development process, and they have recently become involved in planning training during development.

Tavilla says one of the biggest benefits of such teamwork is that every department owns the system and takes responsibility for its success. At HSN the word "system" means not just the hardware and software, but the departmental procedures and policies that support it.

HSN has grown so adept at developing the technology and procedures to find, hook and serve its customers that the company is planning its second growth explosion, this time as an independent service organization. As a retailer of retailing, as it were, HSN will leverage

its vast, proven resources and marketing expertise to sell products for other people. The company already handles special events ticketing for the San Diego Padres and campsite reservations for the U.S. Forest Service and the National Park Service. And it recently contracted with Home Box Office to handle that cable network's subscription orders. In addition, HSN has lately begun to offer its marketing, technological and customer-service expertise, as well as information on its customer base, to startup retailers.

As HSN's internal departments evolve and grow to handle this new area of business, their close work-

From planning to implementation, every application is a joint project of all the departments it will affect. Department managers sit on a development committee to provide oversight, and users work with the IS staff to determine requirements and do testing.

ing relationships with IS will be more important than ever. Tavilla is committed to avoiding the distance and lack of communication that plague so many large, diversified companies, and she enjoys an unusual rapport with her management peers and user departments.

"I hear other [CIOs] talking about their user departments like they're somebody they see once a week or something," she said. In her eyes, that is their downfall, because it keeps IS from fully integrating with the business functions. There is no separation of business and IS at HSN, where Tavilla and her management peers are continually developing the whole business, not just a computer system to facilitate it. ☐

TECHNICAL PROFILE

Home Shopping Network Inc. is the parent company of the Home Shopping Club, which accounts for 90 percent of its \$1.1 billion revenues. It is also parent to a host of smaller subsidiaries that provide a broad range of products and services—from diversified marketing and media services to health-care products, travel services and insurance.

The company is headquartered in St. Petersburg, Fla., and has fulfillment centers in Florida; Salem, Va.; Waterloo, Iowa; and Reno, Nev., as well as a telemarketing center in San Diego.

Large Systems: HSN has 11 Unisys A Series mainframes, four of which handle every aspect of the company's real-time order-taking, customer service, research analysis, sales, inventory and purchasing. Three handle fulfillment in HSN's off-site warehouses throughout the country, and four are used exclusively for software development and testing.

End-User Computing: A WAN comprising 25 Novell LANs of from three to 20 nodes each handles most of HSN's administrative office applications. The LANs consist of AST 286s and 386s. This year HSN is upgrading its servers to AST 486s.



Software: Ninety percent of HSN's software is developed in-house, the most notable exception being its Mapper

system from Unisys, which it uses to track product sales performance, and its corporate E-mail system. The IS group uses Unisys's combined CASE/4GL tool Linc for mainframe software development, and FoxBase and C for PC programming.

Communications: HSN has an ethernet backbone and is in the process of installing an FDDI ring for the additional bandwidth. T-1 and 56K lines link its 11 mainframes across the country and its San Diego telemarketing center.

TEACHING CPR TO HEALTH PROFESSIONALS

BY ALLAN E. ALTER

Surprisingly few hospitals have implemented computerized patient record systems—CPRs. But a handful of innovators now light the way to a future in which computer-aided medicine achieves both a consistently higher standard of care and tantalizingly lower costs.

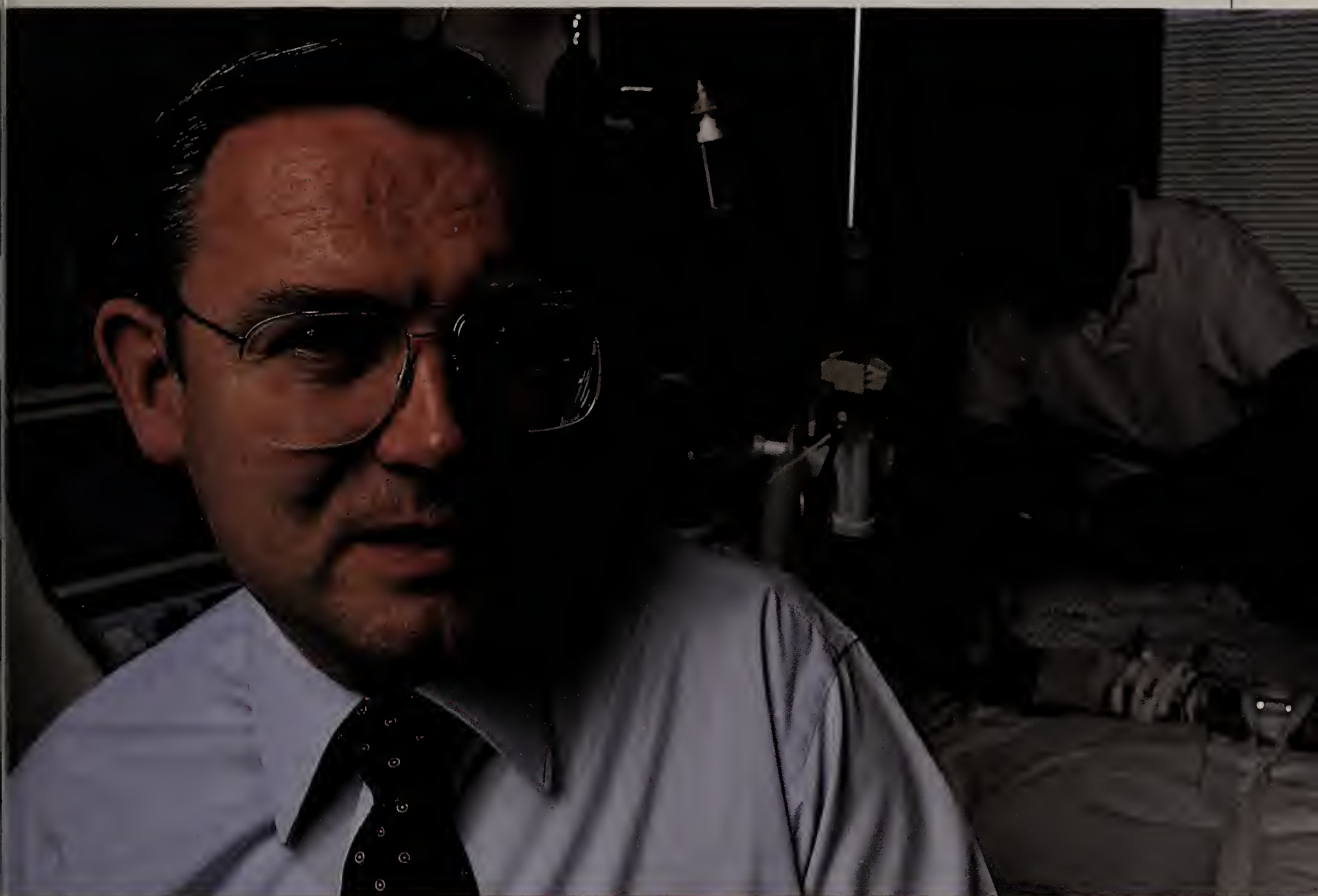
If you were to poll health-care professionals, nine out of 10 would probably agree that computerizing patient records will lead to a better standard of patient care at lower costs. Yet fewer than one in 100 have taken the prescription to heart. That makes Terry Clemmer, the director of critical-care medicine at LDS Hospital in Salt Lake City, one in a million.

For 16 years Clemmer has practiced medicine at the hospital that pioneered computerized patient record (CPR) systems, and that today has one of the world's most advanced CPRs. LDS Hospital is one of those rare institutions where nearly all current medical information on patients—laboratory results, medications, medical monitor data, and physicians' and nurses' notes—is available through a single system.

That's an enormous help in medical decision-making. "When I want to evaluate a patient's cardiovascular system, all the data to do so is in one place," said Clemmer.

More recently, Clemmer has begun using computers to refine patient monitoring and standardize medical procedures and care on best practices. This has brought quantifiable financial and medical benefits (see related story, Page 49). "Everything we have standardized has improved outcomes and decreased costs," said Clemmer. "The computer will do more to change medicine than many of the new biotechnologies."

LDS and a few other institutions have demonstrated that a computerized patient medical-record system can help lower costs while improving the quality of medical care. Prodded by the nationwide uproar over costs, the medical profession and the health-care industry are now becoming interested. One of the most prestigious American medical organizations, the Institute of Medicine of the National Academy of Sciences, recently began to actively support the CPR concept. Insurers such as Aetna, and compan-



ies such as Motorola that pay out big bucks in employee health benefits, have joined the Institute of Medicine in establishing a Computer-Based Patient Record Institute. Politicians are also getting into the act: Several members of Congress have introduced bills—including one bill backed by the Bush administration—that would mandate CPRs.

Health-care CIOs and IS experts disagree on whether regulation or competition will drive institutions to install CPRs. But they do agree that after years of disinterest, CPRs have become a priority. A major reason for this is that old ways of storing and processing medical information have become unacceptably cumbersome, duplicative and costly. Clinical depart-

ments such as pharmacy, radiology, cardiology and laboratory have long been automated, according to Erica Drazen, a vice president at Arthur D. Little Inc. in Cambridge, Mass. But perhaps one health-care institution out of 100 integrates the patient data in these systems into one electronic record, she said. Most health-care facilities still keep important patient records on paper, even though paper records are often incomplete, hastily scribbled and easy to lose.

For both medical and financial reasons, health-care institutions are finding they must break with the past and create ways to share this information. This requires a CPR system that reliably unifies at least the critical components of the patient record into a central repository and makes the information easily avail-

TERRY CLEMMER:
"The real power of the computer is going to be in helping us create standardization of care and monitor that care."



PETER JOHNSON: *Still images with voice annotations are in the works.*

able over a network to all who need it. That information can include both historical data, such as summaries of previous hospital stays and past test results, and data about the patient's current conditions and treatments. It can also include other kinds of information, such as data on the cost of tests and medications or articles from medical journals or reference books.

For example, institutions are under pressure to avoid unnecessary medical procedures. A single, shareable source of patient information can help further this aim. One obvious benefit is that data captured in one department can be made available to others. Thus when patients move between departments or institutions, their histories and test results are already stored and ac-

cessible, precluding the need for retesting or reentering data.

Another CPR-based restraint on excessive testing is the provision of cost data to physicians. A study conducted at the Regenstrief Institute in Indianapolis found that physicians ordered 14 percent fewer tests when the system informed them how much the tests cost.

"It's a wonderful opportunity to avoid duplication of testing," said Larry D. Grandia, vice president of information systems of Intermountain Health Care in Salt Lake City, which includes LDS Hospital.

Health-care "systems" like Intermountain—chains that may include tertiary hospitals for acute care, community hospitals, outpatient clinics, HMOs and individual specialists—find it difficult to operate without net-

worked CPRs. "We want to move the patient to the most appropriate setting for cost and quality," said Grandia. CPRs and systemwide networks make patient records and clinical data available anywhere, anytime, to anyone who needs them in the system.

This is crucial at Geisinger Health Care System, of Danville, Pa., which serves some rural areas. "It's not uncommon for someone in a remote clinic to see their doctor at 9 a.m., go to our community hospital for a test at 12 noon, and be admitted to a tertiary hospital later that day," said Geisinger CIO Bill Reed. "There's no way a paper flow can rapidly follow that progression. The only way to do that is through an automated system."

As CPRs gain improved networking capabilities, they will be capable of bringing more information to caregivers. The Dartmouth-Hitchcock Medical Center in Lebanon, N.H., plans to add still images, complete

with voice annotations by the radiologists, to its CPR, according to Vice President of Information Systems and CIO Peter A. Johnson. And Clement J. McDonald, chief of the medical informatics section at Regenstrief, predicted that caregivers will soon begin using handheld terminals to enter and obtain patient data.

But creating a single, networked source for medical data only scratches the surface of what CPRs can do. The CPR-building pioneers at LDS, said Grandia, "wanted a computer that could interrogate itself—assess its own database, create alerts and reminders to caregivers and point out important clinical findings to physicians and nurses."

To make this possible, Grandia said, LDS's doctors and IS department built a rule-based expert system and connected it to their CPR database. "A new laboratory result would say to the database, 'Does anyone care that I'm a low potassium?'" The computer would check on whether the drugs the patient was taking were sensitive to potassium levels. If they were, the computer would automatically alert the pharmacy department. "The computer could be a safety net

The old ways of storing and processing medical information have become unacceptably cumbersome, duplicative and costly.

for caregivers, catching problems that might have been overlooked," said Grandia.

The CPRs at LDS, Regenstrief and other institutions with expert systems can apply the same "does anyone care?" principle to monitor readings. Their systems can alert physicians when patients are susceptible to particular complications and monitor those patients' vital signs for danger signals. Such systems are proven lifesavers. According to Clemmer, the survival rate of LDS patients with adult respiratory distress syndrome has increased from 10 percent to 40 percent since the computer began monitoring patients to compare their oxygen levels against a rule base and to prompt physicians to change ventilator settings.

But even real-time monitoring with expert systems does not fulfill the potential of computer-based systems. "We have come to understand [that] the real power of the computer is going to be in helping us create standardization of care and monitor that

Ounces of Prevention Add Up

.....

Some institutions can show how their CPRs are helping keep costs in line

While many health-care CIOs and physicians working with computerized patient record systems (CPRs) suspect that they are saving their organizations money, Reed M. Gardner, the medical informatics co-director of LDS Hospital in Salt Lake City, has the statistics to prove it.

According to Gardner, the systems improve medical outcomes by alerting caregivers to potential problems, prompting them to carry out certain procedures and standardizing best practices. That saves money on corrective or continued treatments. For instance, monitoring oxygen levels and prompting physicians to change ventilator settings has improved the survival rate of patients with adult respiratory distress syndrome, saving LDS \$3.6 million annually.

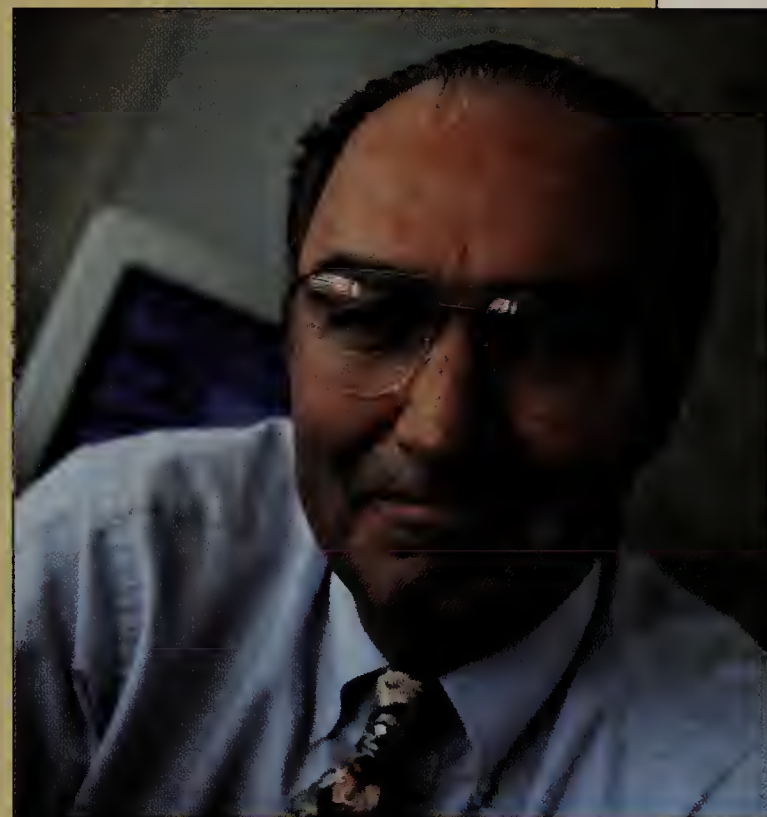
Alerting doctors and pharmacists to potential adverse drug reactions saves \$1.1 million, and reducing the wound infection rate by standardizing on when to administer antibiotics has saved \$750,000 in additional medical treatment. Post-operative antibiotic monitoring ("reminding physicians that two days on an antibiotic is just as effective as five days") saves \$324,000 annually. Gardner was able to come up with a total of \$7 million in yearly savings on just 10 such items.

Other institutions have likewise attributed hard savings to their CPRs. Peter A. Johnson, vice president of information systems and CIO of the Dartmouth-Hitchcock Medical Center in Lebanon, N.H., said that by automating patient records, the center has been able to cut 14 medical-records staff positions in the last six years and avoid hiring another 20 to 30 people. A cost-benefits study by KPMG Peat Marwick found that a planned upgrade of Dartmouth-Hitchcock's CPR system will save as much as \$4 million annually.

All these savings may not go straight to the bottom line, observed John Glaser, CIO of Brigham and Women's Hospital in Boston. Some of the money will be passed on to other stakeholders: the insurers, employers, patients and taxpayers who bear the costs of health care.

And more than money enters the ROI equation. "What's the value of years of productive life? Or of not having pain in your body?" asked Glaser.

-A. Alter



REED GARDNER says the CPR at LDS Hospital saves that institution \$7 million a year in corrective or continued treatments.

care," Clemmer said.

"Standardizing care is very important [in order] to make real advances in medicine," he continued. "If today I ask any physician what is the best antibiotic for treating a certain type of pneumonia, no one

or the best way to administer drugs. For example, physicians in LDS's critical-care unit were able to reduce the rate of infection from post-operative wounds from 1.8 percent to 0.4 percent—lower than at any hospital in the country, said Clemmer.

verse drug reactions and were surprised to discover that such reactions constituted a much larger problem than they had thought. Normally, the medical staff at a hospital the size of LDS reports 10 to 20 adverse reactions a year, Clemmer explained. LDS designed a program that monitors patient data and alerts pharmacists to signs of possible adverse drug reaction, which pharmacists can then investigate further. In an 18-month period over 1989-1990, LDS



LARRY GRANDIA: "The computer could be a safety net for caregivers."

can tell me. They can only say which antibiotics are effective, because physicians practice medicine in a very random way. The same physician on different days will use different antibiotics for the same condition. But once we set a standard, we can tell whether a new therapy is better than our standard or not. We can evolve toward the best care."

Standardization is not limited to finding the most effective drugs. The same principle can be applied to any therapy, test or procedure. It can also identify the least expensive of several equally effective therapies,

They set this standard by programming the CPR database to determine the best time to administer specific antibiotics. Now the system advises LDS surgeons how far in advance of surgery to administer a particular antibiotic. If surgeons choose to override this standard, they must note their reasoning in the CPR. LDS can check the decision against the medical outcome and either improve the standard or improve the surgeon.

CPRs excite physicians for another reason: They can be used to unearth new medical findings. LDS's medical staff used their CPR to study ad-

turned up 731 incidents of verified adverse drug reactions.

But the discovery didn't stop there. "Even more exciting, we [learned] that women have twice as many [adverse reactions] as men, and older people have twice as many as younger people," said Clemmer. "Now we will use the computer to find what drugs to avoid for little old ladies and use the computer-alerting system to reduce the problem."

Despite CPRs' beguiling promise, the decision to implement one is far from being a no-brainer. It is a costly undertaking with many complex problems to solve. And that is why many health-care CIOs are leery of congressional efforts to mandate CPR adoption. They fear such efforts may force unrealistic timetables and unachievable goals on the industry.

"We wanted a computer that could interrogate itself—assess its own database, create alerts and reminders to caregivers and point out important clinical findings to physicians and nurses."

—Larry Grandia

YES. I WANT TO KEEP MY COMPETITION IN CHECK.

- ☐ Please send me complete information about FOCUS.
- ☐ CAN'T WAIT. Please call me ASAP.

I'm planning to purchase a 4GL in:

☐ 1-3 mos. ☐ 3-6 mos. ☐ 6-12 mos.

NAME _____ TITLE/DEPT. _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

() _____
TELEPHONE _____

DATABASES USED _____

OPERATING ENVIRONMENT _____ MACHINE TYPE _____



Call 800-969-INFO

IBI  **FOCUS**

Information Builders, Inc.

FOCUS is a registered trademark of Information Builders, Inc.



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1305 NEW YORK, NY

POSTAGE WILL BE PAID BY ADDRESSEE

ATTN: Product Information Center
INFORMATION BUILDERS, INC.
1250 Broadway
New York, NY 10117-0582



YOU CAN'T KEEP THE COMPETITION IN CHECK UNLESS YOU ANTICIPATE ALL THEIR MOVES.



FOCUS FROM INFORMATION BUILDERS: Nothing Else Lets You Analyze And Utilize
Mission Critical Information From Any Database On Any Platform.

UNMANAGEABLE DATA WILL NEVER BE INFORMATION

If only there was a way to work with different DBMS,
on different platforms, with a single set of software tools.

A way to develop applications using all your data, no
matter where it is, to run transparently on any platform.

A way that avoids system bottlenecks and fully utilizes
your information investment, so that mission critical
never becomes mission impossible.

THERE IS A BETTER WAY

It's called FOCUS from Information Builders. The
specialists in distributed information systems.

And with more than one million users in every one
of the Fortune 100, FOCUS is the number one 4GL

for end-user computing and application development.

DO ANYTHING WITH INFORMATION

FOCUS is powerful enough to provide decision
support features like business graphics, spreadsheets
and the best report writer in the business. With an
unmatched ability to control and integrate critical
information systems within your enterprise, FOCUS
lets departmental users maintain applications that
meet their requirements.

YOU WANT IT, FOCUS CAN CREATE IT

With comprehensive built-in tools you get the
flexibility to develop anything from highly structured

data management applications and decision support
systems, to simple ad hoc queries and reports.

With FOCUS, data becomes information, and isn't
that exactly what you've always wanted?

So let your competition make the wrong moves
while you make the winning one.

For more information on FOCUS and how it can
fulfill all your data management needs or to attend a
FREE Seminar...

Call 1-800-969-INFO

In Canada call 1-416-364-2760

IBI  **FOCUS**
Information Builders, Inc.

Commercial CPR systems aren't cheap. According to a recent survey of 12 vendors conducted by the Institute of Medicine, a medium-sized hospital would spend between \$2 million and \$6 million to purchase or lease a CPR system; on top of that add 10 percent of the purchase price to cover annual maintenance. And CPRs must compete for funding against other needs—such as hir-

even LDS and Regenstrief's systems have been slow to include text-based records written by physicians. CPRs must make it quicker and more convenient for physicians to enter and encode information than to write it by hand. "There can be reasonable resistance to doing something that will take longer," said McDonald. "The challenge is to find a way for physicians to enter information in a struc-

place," said ADL's Drazen. "A teaching hospital will have different priorities than a community hospital, a health-care system from a standalone institution."

The success of CPRs depends on user involvement and leadership, and a team spirit that transcends departmental boundaries and traditional pecking orders, said Clemmer. "You have to have people who communicate and treat each other as equals. CPRs are especially dependent on nurses and therapists, who provide most of the input to the system."

Drazen confirms that CPRs will remain a hard-sell in many institutions. But regulation, competition and demand from IT-enlightened physicians may leave institutions with little choice but to try. ☐

"Everything we have standardized has improved outcomes and decreased costs. The computer will do more to change medicine than many of the new biotechnologies."

—Terry Clemmer

ing more nurses—and revenue-enhancers such as building more operating rooms.

In addition, the technological and systems-integration issues surrounding CPRs are daunting. Many health-care institutions have legacy departmental databases stored on incompatible host computers. Their IS executives need to find computing standards and other ways to integrate these systems, and to impose consistent definitions on the medical terms and code numbers stored in these databases—much as manufacturers must standardize part numbers and engineering terms. And while paper records are hardly bastions of privacy and accuracy, CPRs must be secure and dependable 24 hours a day to gain the confidence of the medical staff.

Inputting data is the most difficult part of making a CPR system work, according to Regenstrief's McDonald. One reason is that "the data comes from so many sources. [Installing a CPR] is a lot like doing brain surgery. You have to suture a lot of nerves to get it connected." Another reason is that doctors have little tolerance for systems that make it difficult or time-consuming to enter or obtain data—which is why

tured form without slowing them down. That's still not a done deal."

CPRs may face resistance if doctors believe the systems will interfere with or alter their established work habits. "Computers should adjust to our life," and not the other way around, said Dr. Bill Bria, director of the critical-care medical unit and medical director of clinical information systems at the University of Michigan Medical Center in Ann Arbor.

Even a well-intended design misstep can mean rejection. Reed M. Gardner, the medical informatics co-director of LDS Hospital and the co-author of a book describing its CPR (see recommended-reading list), recalled a medical-alert system that flopped with nurses because it included a flashing yellow light on top of the computer at their station. Nurses thought the light signaled to patients that someone had screwed up.

CIOs and medical staff must also give careful thought to the system's output. Caregivers do not realistically expect a CPR to contain every patient's entire medical record, according to Bria. The real question for CIOs is what information do caregivers need most? "The applications you need will vary from place to

RECOMMENDED READING

Aspects of the Computer-based Patient Record

Marion J. Ball and Morris F. Collen, editors; Springer-Verlag New York Inc., New York, 1992: a collection of articles and research papers exploring the issues and benefits of computerizing medical records.

The Computer-Based Patient Record: An Essential Technology for Health Care

Richard S. Dick and Elaine B. Steen, editors; National Academy Press, Washington, 1991: the report of the Institute of Medicine's Committee on Improving the Patient Record.

HELP: A Dynamic Hospital Information System

by Gilad J. Kuperman, Reed M. Gardner and T. Allan Pryor; Springer-Verlag New York Inc., New York, 1991: an in-depth study of LDS Hospital's pioneering CPR system.



Subscribe And Save.

~~\$94*~~ **\$59**

Yes, enter my one-year subscription to *CIO* magazine and bill me later for only \$59, a savings of over 37% off the basic rate.

Name

Title

Company

Address

City

State

Zip

The basic one-year
subscription rate for
CIO magazine is \$94.

**This is a domestic rate only (Canada & US). The foreign rate is \$175 US.*

AD92

**PROCESS
IMMEDIATELY**



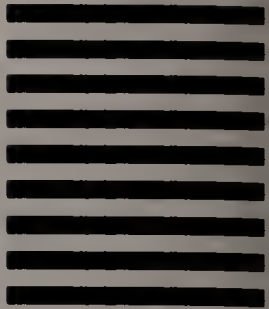
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900



Once Again, The Relationship Between Power and Size Has Been Redefined.



Napoleon Bonaparte with his Carrier SL/25

INTRODUCING THE EVEREX® CARRIER™ SL/25

Not since the General crowned himself Emperor has there been such a convincing advocate for the small and the mighty. The Everex Carrier SL/25 delivers startling 386™ SL 25MHz performance in a true letter-size package, with the most extraordinary range of capabilities to come along in generations.

The Carrier SL/25 is the first notebook computer designed with the understanding that your needs for serious power and

flexibility don't diminish when you're on the move. You not only need more mobility, you need more computer.

This is it.

Unique to the SL/25 are removable 80MB or 120MB hard drives with convenient forward access—which easily snap out to be locked up for tighter security, or used in a desktop machine.

With SimulScan™, the diminutive SL/25 can command an entire room. It plugs into a large external CRT for meetings and demonstrations, and will display on its own screen, the CRT or both at once.

Batteries, like the hard drives, quick-load from the front. Extensive Power Management features efficiently control battery power, with a continuous battery system that lets you hot-swap batteries in the middle of an application for potentially unlimited battery operation. It even has the remarkable ability to enter suspend-mode, then resume later right where you left off.

To complete this highly field-maneuverable 5.9-pound[†] package, we've added a built-in trackball along with the latest versions of MS-DOS®, Microsoft® Windows™, and a padded carrying case. The Everex one-year parts and service warranty even includes free overnight pick-up and delivery within the continental U.S.

With so much sheer force in such abbreviated form, the Carrier SL/25 is destined for leadership. Call today for more information or the reseller nearest you.



- Intel 386™ SL, 25MHz, CPU, 64K Cache
- 4MB RAM (Extendable to 20MB)
- Fully Application Compatible Suspend/Resume with APM support
- Tactile 81-Key Keyboard
- Enhanced Parallel Port
- Additional Battery Included

1-800-262-EVER

In Canada 1-800-661-2003
Outside North America 510-498-1111

EVEREX
EVER for EXcellence™

[†]Includes battery. © 1992 Everex Systems, Inc. EVER for EXcellence is a registered trademark, and Everex is a trademark of Everex Systems, Inc. The Intel Inside Logo is a trademark of Intel Corporation. Other company and product names are the trademarks of their respective holders. International Operations: Benelux 31.73.408.308, Canada 416-829-3637; Far East 852-369-2828; France 33.1.69.0760.41; Germany 49.69.69.50040; Spain 34.1.430.9212; United Kingdom 44.81.205.0607; Italy 39.2.4802.1844.

The Fine Print

Advanced printer options can help organizations save money and space. They can also substantially change the way information is distributed, processed and presented.

BY LUCIE JUNEAU

Today's printers are undergoing a metamorphosis. Cross-breeding with other office workhorses, they're shedding their old, single-function identities and merging into a new, hybrid class of hard-copy output devices. At the same time, improvements in resolution and color capabilities are enticing many organizations to produce their own documents in-house.

According to BIS Strategic Decisions, a market research and consulting company in Norwell, Mass., it is likely that every major vendor of single-function scanners, fax machines, copiers or printers has at least one multifunction product under development. Multifunction machines will cost less than the sum of the single-function products they're replacing and save space to boot. They will also change the way information is distributed and processed.

Some of the first products to of-

fer users multifunction capabilities aren't multifunction peripherals at all; they're accessories to be used with existing equipment. The Desktop Document Manager from Alacrity Systems Inc., an add-in controller card for PCs running Microsoft Windows 3.1 or higher, attaches to the user's laser printer, phone line and scanner, making it possible to scan, fax, print and copy right from the Windows desktop. Users can scan in hard-copy documents and store them in a compressed format. To reproduce hard-copy originals, users scan the documents and then output them on the laser printer. Electronic faxes can be sent right from the PC; hard-copy documents are faxed using the scanner. Faxes received are printed on plain paper via the laser printer.

HP's LaserJet Fax, an add-on box that enables HP LaserJet printers to print incoming faxes at 300-by-300 dots per inch (the standard for conventional fax machines is 200-by-200 dpi), produces better-looking copies than a fax machine and eliminates the expense associated with printing on expensive thermal fax paper. JetFax, from JetFax Inc., which can be used with any laser printer supporting HP's PCL page-description language, plugs into the printer, a phone line and either the network or an individual PC. In a network environment, it eliminates the need for a dedicated fax server. Printers with built-in or optional fax capabilities are also catching on.

Another variety of multifunction device starts with the copying function and adds printing and/or scanning. At the high end is Xerox Corp.'s DocuTech Network Publisher, printing at 135 pages per minute. A combination copier, scanner and printer, the DocuTech is a high-resolution, 600-by-600 dpi machine that includes sophisticated finishing fea-



They calculated that a 100% increase in business needed a 900% increase in productivity.



What we put together.

Complete analysis of their document needs, a redesigned document publishing process, and a dedicated account manager.

Lynn L. Wells
Document Management Representative



When a major health insurer suddenly doubled its customer base, their MIS department quickly predicted disaster. The company's in-house document publishing system was already overloaded. They had to drastically cut the time it took to produce vital documents or risk the company's reputation for customer service. That's when they called Lynn Wells and the Xerox team.

Working together, they saw that merely upgrading equipment to add capacity was not the solution. So they took a fresh approach and completely redesigned the company's document publishing processes. Carefully building on existing systems, they integrated Xerox workstations, software, scanners and laser printers to create a custom publishing network.

Benefit booklets that once took forty-five days to publish now take less than five, a 900% increase in productivity. MICR-encoded checks and claims explanations are being printed and mailed together, saving \$350,000 a year in postage. And forms are now created electronically, on demand, reducing costs by 30%.

If saving time, money and customers is your idea of a productive partnership, let us help you put it together. Call 1-800-TEAM-XRX, ext. 147G.

Xerox
The Document Company

tures such as the ability to do perfect binding and saddle-stitching. Using the DocuTech's oversized monitor for electronic paste-up, users can combine photos and text scanned into the system with electronic input received via floppy disk or from network PCs and workstations to produce publications of near-professional quality. A similar machine, Kodak's 1575, prints at 70 ppm and will be available with a network printer option by the end of the year.

Networking Capabilities

By mid-decade, half of all PCs will be networked, some analysts predict. In anticipation, many printer vendors are beginning to provide their products with network links, the ability to switch between emulations seamlessly, and/or more-sophisticated printer-management capabilities.

There are three ways to link a printer to a network: via an internal board that allows a direct hookup to the network, via an add-on box linking the printer to the network, or through a dedicated server. Many vendors also offer the ability to switch between page-description languages automatically, which can make their printers much more convenient in a shared environment.

Unfortunately, there's more to running a network printer efficiently than simply hooking it to the network. Where many printers fall short is in their ability to communicate status messages back to the user or network manager. This limitation is particularly frustrating when users and network managers are located some distance from their printers.

Bidirectional communications problems are purportedly less severe in Apple and DEC environments, where network printers typically run Adobe Systems' PostScript, a bidirectional language. DEC also provides a "remote console" monitoring feature with its network PostScript printers.

Insight Development Corp. offers a printer management system, Mosaic, which allows users to monitor printers and printer usage over their Novell NetWare LANs. The system provides complete accounting for

PCL-based jobs, enabling managers to charge back to individual departments for their use of network printers, for example. It also provides load balancing, helping to ensure that print jobs are distributed efficiently among printers.

HP recently developed a bidirectional parallel interface that will be used with its new line of printers and could eventually facilitate com-

While resolution enhancement can improve the look of text, analysts caution that it does not do the same for halftones; in fact, it can even degrade their appearance.

munications for any printer attached to a network via a file server or a network box. The Network Printer Alliance has been working with HP's interface to develop a specification that will be submitted to the IEEE. Once the interface is widely available, vendors will need to develop software to allow printers to communicate over that interface in different operating environments.

Resolution and Image Enhancement

One result of the growing sophistication of printing devices is that more companies are producing documents in-house rather than turning to professional typesetters and printers. For years, the standard resolution for office printers has been 300-by-300 dpi. That resolution is fine for most office printing applications, but not for small type sizes, graphic images and high-profile documents traditionally produced by professional typesetting machines at 1200-by-1200 dpi. Now the office printing standard

appears to be shifting upwards, to 600-by-600 dpi.

In the last year, the first of what should become an avalanche of affordable 600-by-600 dpi printers hit the market. QMS Inc. introduced two desktop laser printers that offer users a choice of resolutions—either 600-by-600 dpi or 300-by-300 dpi—for about \$6,000. When the higher-quality output isn't needed, users can select the speedier option. Rumors abound that HP will soon introduce its own 600-by-600 dpi printer, the LaserJet IV, which will include a powerful RISC-based processor to handle the increased rasterization and page-setup requirements.

Xerox's 4650, a 600-by-600 dpi unit that prints up to 50 pages a minute, offers an interpolation feature that enables applications written for Xerox 300 dpi centralized printing systems to take advantage of the machine's high-resolution capabilities.

High-resolution printers running PostScript or clones won't require an interpolation feature because PostScript is resolution-independent: PostScript applications will print at whatever resolution a PostScript printer provides. However, most PostScript printers don't approach the speed of Xerox's 4650, let alone the company's 600-by-600 dpi, 135 ppm 4135, which Xerox claims is the fastest cut-sheet laser printer on the market.

The IBM LaserPrinter 4029 series can provide 600-by-600 dpi resolution with the addition of 4MB of memory and a PostScript option. The 4029s support both IBM-compatible PCs and Apple Macintoshes. They also come standard with IBM's Print Quality Enhancement Technology (PQET), which improves the quality of 300-by-300 dpi using a dynamic dot-sizing system to sharpen the resolution and smooth edges. NEC, Apple, HP and other vendors also offer resolution-enhancement features in some products.

While resolution enhancement can improve the look of text, analysts caution that it does not do the same for halftones; in fact, it can even degrade their appearance. (Xerox claims

5 problems. 800 solutions.

Nobody offers you more 800 service than Sprint. Nobody.

Let's say your operation has locations in different area codes. So servicing your customers on a local basis is a real problem.

Thanks to Sprint's Area Code Routing, every 800 call automatically goes to your location in the customer's area code. Or your nearest available location to the customer's area code.

Which means customers get more customer service. And less lip service.

Maybe you've got a different problem. Maybe you need 800 service that routes your calls to different locations. Depending on time of day.

Enter Sprint's Time of Day Routing. Your West Coast office picks up the slack when your East Coast office goes home at night. And your East Coast office begins the day. While your West Coast office is still in bed.

No missing calls. No unnecessary overtime.

But your problem isn't time. Your problem is staffing. You've got people in L.A. Chicago. New York.

You don't want Chicago sitting around. Or New York burning out. With Sprint's Call Allocator, what you don't want, you don't get. You determine what percentage of your 800 calls you want to go to each location.

Talk about maximizing your sales force. How about companies that have dealers all over the country? How about them.

With Sprint's Dealer Locator, you no longer have a lot of different 800 numbers in a lot of different states. Your customers call just one 800 number. Enter their zip code. And the calls are routed to the dealer closest to them.

Yes. All those dealers. And one 800 number.

What about your worst nightmare? Your 800 number goes down. Thanks to Sprint's pre-planned, pre-stored Command Routing, you'll be up and running in minutes.

Sprint. 800 service. Unlimited solutions. Call 1-800-788-1000.



Not just another phone company.™

that PQET enhances both text and halftones.) To address that issue, some companies have introduced image-enhancement techniques. DECimage refines the dots in images and makes them sharper, leaving text undisturbed.

Enhancement techniques are good and 600-by-600 dpi resolution printers even better, but they still don't match the 1200-by-1200 dpi resolutions offered by professional typesetters. LaserMaster Corp.'s 1200 Personal Typesetter, a PostScript printer offering 1200-by-800 dpi resolution, can print 11-by-17-inch documents at 14 ppm and letter-size at 20 ppm. List priced at \$16,995 (including installation and setup), it includes LaserMaster's proprietary TurboRes image-enhancement technology and an AT-compatible controller board with 16MB of RAM to improve throughput and provide the oomph to handle rasterization requirements.

More affordable is LaserPix from XLI Corp. LaserPix (\$1,950) comes with a controller board for IBM PC

compatibles and a printer interface card supporting a variety of 300 dpi laser printers. The product intensifies the firing of the printers, raising the output to up to 1200 dpi for text and 2400 dpi for images. The LaserPix can output text at 300 or 600 dpi, and images at 1200 or 1700 dpi, allowing a choice between speed and enhanced resolution.

Color Quality

In the color arena, quality is improving while prices are falling, making color printers attractive to a wider audience. While there were about 1.2 million units in the United States in 1991, there will be an installed base of about 2.2 million by 1995, according to InfoCorp, a market research firm in Santa Clara, Calif.

New color printing technologies are emerging. Dye sublimation, or Dye Diffusion Thermal Transfer (D2T2), is capable of producing 16.7 million colors and can output prints approaching the quality of color pho-

tos. As with conventional wax thermal transfer printers, dye-sublimation printers heat a ribbon to place a dot of color on the paper. The difference is that with dye sublimation, temperature levels can be adjusted precisely, enabling the machine to produce a wider range of hues. To date, the dye-sublimation machines on the market have offered resolutions of 300-by-300 dpi, and most come with PostScript Level II.

Consumables for dye-sublimation printers are pricey, averaging \$5 or \$6 per page compared to about 50 cents per page for traditional wax thermal printers. However, the price of both consumables and the printers themselves are falling as more vendors enter the market. In July Tektronix Inc. introduced the Phaser II SD for \$9,995, making it the least expensive dye-sublimation printer available at the time. Consumables for the Phaser II SD are also relatively inexpensive, selling for about \$2.25 per page. Compared to

Could you make times more

EDS helped Plumley answer yes.

Worldwide demand for custom auto parts manufactured by the Plumley Companies is skyrocketing. With the help of EDS, they developed a plan to boost production by streamlining and automating their manufacturing operations. The results: **Productivity has tripled.** Manufacturing lead time

has been trimmed by 70%. And customer satisfaction has improved.

EDS helped Plumley implement a "just-in-time" manufacturing process. This gives Plumley the ability to **use materials more efficiently.** In addition, the company can offer smaller production lots to meet the needs of more customers

the price of printing a color photo, that isn't unreasonable.

Another new twist on wax thermal transfer technology is Tektronix's solid-ink Phaser III. The Phaser III uses solid crayons that load into the printer and melt down to place colored dots on the page. The unit sells for just under \$10,000.

These new, more sophisticated color technologies are driving down the price of conventional thermal transfer technology. Three years ago, thermal transfer printers sold for about \$10,000. Now some vendors' models are priced at under \$5,000, and further price cuts are expected. They are also being squeezed by competition on the low end, from color ink-jet printers. HP's PaintJet XL300, a high-end color ink-jet printer, lists for about \$3,500 without PostScript compatibility, \$4,995 with PostScript.

One advantage of ink-jet printers like the XL300 is that they use plain paper, which costs less than the special coated stock required by most

Unfortunately, there's more to running a network printer efficiently than simply hooking it to the network.

wax-based printers. However, ink-jet printers aren't as good at producing color transparencies. And ink jets tend to be much slower. Despite its RISC-based processor, the XL300 prints graphics at 1.5 to 6 minutes a page. Most thermal transfer printers output graphics pages at less than one minute per page.

Speedy full-color printers are virtually nonexistent; however, users with high-volume applications who want speed and color can look into the new highlight color printers on the market. Xerox's new 4850 high-

light printer, for example, can churn out 50 pages per minute or more. Unlike full-color printers, which make multiple passes over each page to lay down each color, the 4850—based on laser xerographic technology—can lay down multiple shades of black and a single color (red, blue or green) in a single pass. Xerox touts the printer's ability to provide corporations with a tool for drawing attention to information such as the amount due on an invoice, for example.

As the price of sophisticated printing technologies continues to fall, user access to high-quality, user-friendly printing resources that speed the flow of information continues to grow. With more printing options and improved ways of managing printing resources, both users and network managers are finding that printers—be they traditional or multifunctional—have come a long way. ☐

Lucie Juneau is a freelance writer based in Salem, Mass.

employees three productive?

while sustaining productivity gains.

Plant automation also gives Plumley flexibility without sacrificing the benefits of mass production. Prototypes for customers can be generated quickly and easily. The company can even react to design changes in the middle of the production process

without disrupting the workflow.

Today, Plumley can handle small or large orders faster than ever. Rejects are down. Quality is up. Not surprisingly, **revenues are up too, an impressive 300%** since the program's inception.

Changes in technology are creating new ways to boost produc-

tivity and improve customer service.

EDS is the world leader in applying information technology. To find out how we could help you, write Barry Sullivan, EDS, 7171 Forest Lane, M40, Dallas, TX 75230. Or call (214) 490-2000, ext. 140.



TAKE ADVANTAGE OF CHANGESM

FRONTLINE



BY PORTIA ISAACSON

As wireless communications technologies begin to make good on their promise of new freedom and flexibility, businesses will increasingly find they can make severance pay

Removing the Ties that Bind

WIRELESS WHAT?

Today wireless datacom is part fact, part fiction. But the closer one looks, the more inevitable it appears.

When I hear the term "wireless" and the implied "wireless datacom," I think of "horseless carriage"—the term first applied to the automobile. Will wired datacom go the way of the horse? After all, when you think about it, wires are pretty silly. They tie us to physical places like desks and offices and prevent us from walking around factory floors and spending time with our customers.

Within 50 years (or sooner) wireless data communications will have as profound an impact on the way we work and do business as wired communications have had in the past 50 years. But it won't happen overnight. Today wireless is a consultant's dream of complex, rapidly changing technologies and rate structures.

The spectrum of wireless communications includes radio-frequency LAN replacements for wired LANs that operate inside, outside and across buildings, and infrared LAN extensions for in-building use (for example, Photonics' Collaborate). Metropolitan-area networks (MANs) with radio-frequency local links (for example, ARDIS and RAM Mobitex) facilitate two-way communication of small packets of data. Cellular telephones enable two-way exchange of larger blocks of data over the dial-up telephone network, while nationwide data-paging and broadcasting (for example, SkyTel and EMBARC) allow for the one-way transmission

of information to one or many mobile computers.

Like entropy, data communications options seem to grow endlessly toward the chaotic. Wireless LANs, such as NCR WaveLAN, offer easy installation and modification advantages over wired LANs (see "Cutting the Cord," *CIO*, May 1991). However, most wireless datacom extends rather than replaces wired technologies and services.

ARDIS, a packet-switched radio network designed for mobile computers, offers datacom services for enterprise applications unlike any wired services. And some, like Photonics' Collaborate, offer a fresh vision of the spontaneous networks that can arise whenever two or more mobile platforms are in the same room.

Today more than 20 percent of all new computers sold in the United States are portables: laptops, notebooks, palmtops and pen computers. All indicators show that number rising to at least 50 percent by 1995.

The dramatically growing population of mobile-computer users and high-value mobile enterprise information systems are creating a demand for data communications anywhere and everywhere. Although docking stations (such as offered with the NCR Safari), LAN adapters (such as the Xircom pocket LAN) and modems to the wired networks will satisfy some users and enterprise applications, opportunities galore exist for wireless datacom technologies and services—if the price is right.

Is It Real or...?

WIRELESS 101

Wireless communications services promise to surpass their wired relatives in product diversity and service offerings. For the next several years, the challenge will be to separate the real from the science fiction. Today's reality of wireless datacom can be appraised using the following exercises:

- Install NCR WaveLAN on a few PCs. Having recently done this myself, I doubt that I will ever again run a wire for a PC network. Although WaveLAN has both advantages and disadvantages when compared with wired networks, today's reality is that WaveLAN works and is frequently cost-effective in new or changing installations.

- Invest in an HP 95LX palmtop computer with an HP Mobile Data Link and SkyStream Receiver, as well as a subscription to SkyTel's one-way data broadcasting. This will enable you to receive messages wirelessly in any conference room, airport, car or house in 170 cities—and the sender doesn't even have to know your location. That's freedom! If you want to receive something more than wireless messages (for example, news of your choice, such as stock

market quotations and sports scores), then try Motorola's EMBARC. For two-way wireless datacom, RAM Mobitex is available. If you feel you must dial into the telephone network, a cellular phone with a smart cable will plug right into the 95LX's serial port. The HP 95LX connects

The real fun may be watching the operating-system suppliers and the features they create for wireless datacom on mobile computers, like deferred I/O, dynamic autoconfiguration and the ability to create spontaneous ad-hoc networks.

FREE VIDEO OFFER!



Pen Computers are reshaping the way field and other mobile workers do their job - in a broad range of application areas.

Over two years ago, GRiD Systems Corporation introduced a new era in personal computing with the debut of the GRiDPAD - the first pen computer. Since that time thousands of GRiDPAD solutions have been implemented in companies like yours.

Learn how GRiD's pen computing applications have dramatically improved the speed, accuracy and completeness of critical business information. Send for your **FREE** 8 minute pen computing video.

YES! Please Send Me My FREE Pen Computing Video!

Name _____

Title _____

Company _____

Street Address _____

City, State, Zip Code _____

Phone _____

Fax Number (Int'l) _____

☐ End User ☐ Reseller ☐ Other: _____

How many employees are in your organization?

☐ 1-100 ☐ 101-250 ☐ 251-500 ☐ 501-1000 ☐ Over 1000

What is your application? _____

Is your purchasing timeframe: ☐ Immediate ☐ 1-3 months

☐ 4-6 mo. ☐ 7-12 mo. ☐ Over 12 mo. ☐ Information only

How many pen computers do you plan to purchase?

☐ 1-5 ☐ 6-10 ☐ 11-25 ☐ 26-50 ☐ 51-100 ☐ Over 100

Please have a sales representative contact me. ☐ Yes ☐ No

*Please complete above information
to qualify for your **FREE** video.*

GRiD



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 623 SAN FERNANDO, CA

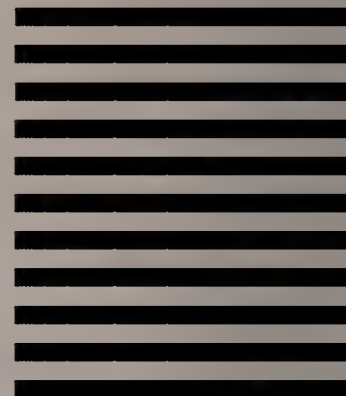
POSTAGE WILL BE PAID BY ADDRESSEE

GRiD SYSTEMS CORP.

DEPT 311

P.O. BOX 9000

SAN FERNANDO, CA 91341-9981





Do you notice anything unusual about this man's computer?

No, it's not an aberration of Newtonian physics.

This man's computer stays attached because he's wearing it. That's right, wearing it.

With the introduction of PalmPAD™, GRiD has created far more than just a new pen computer. We've set the new standard for data collection applications.

Frankly, nothing is easier to use. Entering data, drawing graphics and capturing signatures is a snap.

And PalmPAD is light. Only 2.8 pounds.

Yet, it's tough enough to withstand a 3 foot drop without suffering brain damage.

GRiD PalmPAD also features a large backlit screen. Plus, it's MS-DOS® compatible. So you can customize software applications in no time at all.

And because PalmPAD was designed to accommodate either a modem or a spread spectrum radio, your work force will become a mobile communications center.

Does this mean the end is near for paper forms

and conventional handhelds? We think so.

Because whether your mobile work force collects data on their feet, or hands for that matter, nothing improves the speed and accuracy of collecting information like PalmPAD. For more information, call 800-222-GRiD. And hear about the computer that's turning an industry on its head.

GRiD[®]
Wherever work gets done.™

GRiD Systems Corporation, 47211 Lakeview Boulevard, P.O. Box 5003, Fremont, CA 94537-5003. For information in Canada, call 800-387-0174. In Europe, fax us in the U.K. at (44) 081-759-0466. For South America, Asia, Pacific Rim and the Middle East, fax us in the U.S. at (415) 683-0903. ©1992, GRiD Systems Corporation. PalmPAD is a trademark of GRiD Systems Corporation. All other brands are trademarks of their respective holders.

FRONTLINE

to other 95LXs and to peripherals with an infrared wireless line-of-sight connection.

- Take a look at applications of IBM's PC Radio with cellular and ARDIS nationwide packet-switched radio options.

- Study the much-publicized story of how Otis Elevator created competitive advantage by linking its service personnel with each other and with central (and branch) dispatching via ARDIS.

- Take a visionary look at Photonics' Collaborate, keeping in mind that the Photonics Infrared Transceiver, within a few years, will add only dollars to the cost of a portable computer. Photonics' Collaborate will function as an extension of current networks, providing secure mobile networking within buildings.

- Watch for a host of hardware and service newcomers to the wireless datacom arena. Especially promising is IBM's roundup of cellular-phone-service suppliers as the stepping stones to a nationwide packet-data network superimposed on the cellular voice system. Also worth watching for are new offerings in the spread-spectrum radio-frequency LAN arena.

- The real fun may be watching the operating-system suppliers and the features they create for wireless datacom on mobile computers, like deferred I/O, dynamic autoconfiguration and the ability to create spontaneous ad-hoc networks. For a glimpse of the

future look at PenPoint's communications features and Apple's Newton.

Assessing the Cost

WIRELESS ECONOMICS

The economics of wireless can be as challenging to assess for a specific application as the technology itself.

The easiest case, since the user owns the network,

is the wireless LAN with a one-time LAN transceiver cost (\$700 per computer) and system-maintenance cost. Installation, troubleshooting, maintenance and relocation of a wired LAN are more complex than for the wireless LAN. Frequently the savings in installation and relocation costs alone offset the greater cost of the wireless transceivers, and the flexibility of wireless is a bonus.

Extending present in-building networks to support mobility will be cost-justified on applications of mobile platforms such as notebooks, subnotebooks, pen computers, palmtop computers and personal digital assistants that depend on, or are enhanced by, network connections. Since mobile, collaborative applications are a new breed, payback analysis will be based on the creation of greater value for the business as well as improved productivity.

MANs, which are expensive today, are justified by creating competitive advantage or improved service. Both ARDIS and RAM Mo-

bitex charge for each packet of information transmitted under a usage contract (typically 14 cents per 512 bytes), and they require each mobile platform to have a transceiver with battery (costing less than \$1,000). Although the cost is high compared to wired datacom, the advantage created by linking field personnel to central- or branch-dispatching and data-collection is great. They include:

- More rapid, consistent response to customer requests;
- Consistently collected customer/equipment history for market research, equipment-design improvements and preventive maintenance;
- Better utilization of personnel;
- Knowledge-sharing among personnel, such as service technicians;
- Greater management insight into field processes and problems, achieved though better record-keeping.

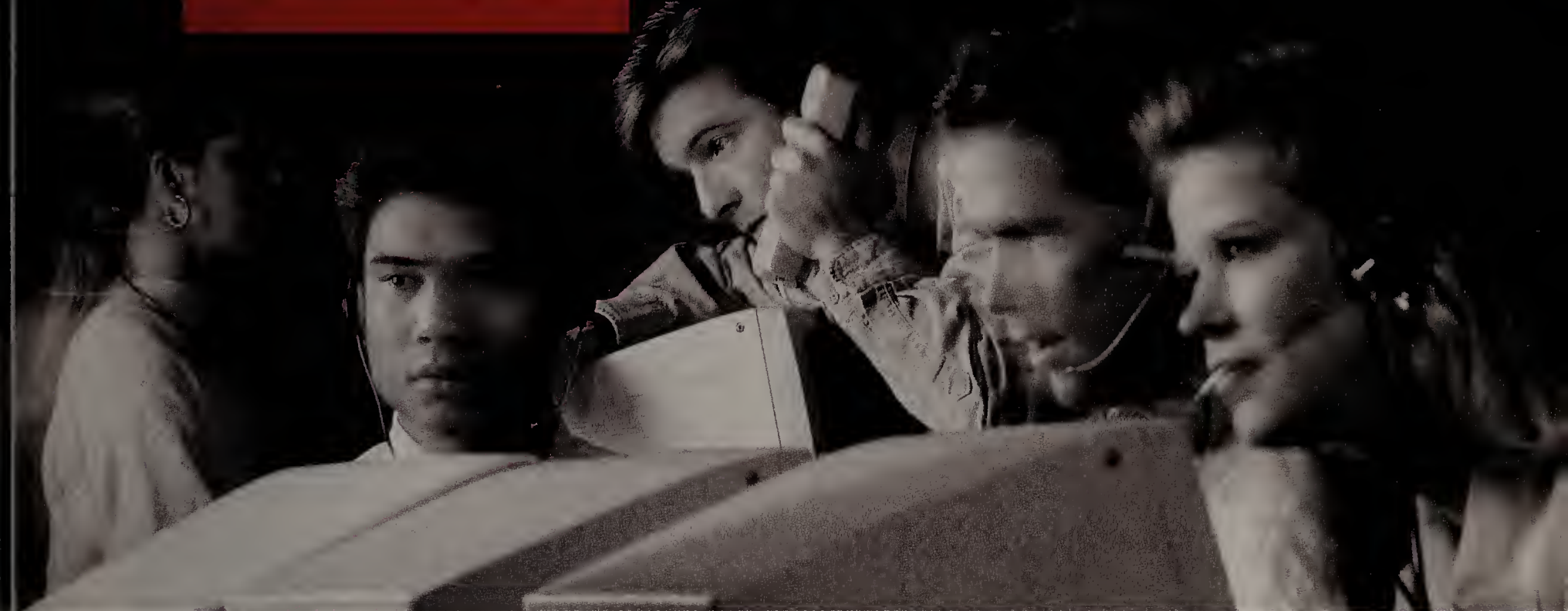
The cost of SkyTel's data-paging and EMBARC's data-broadcasting services, typically between \$50 and \$100 per user per month, is determined by the number of messages broadcast. SkyTel and EMBARC also require that a receiver with battery support, costing about \$500, be added to the mobile platform. Enterprise applications for broadcast information include paging with complete message, one-way E-mail and updating the price lists of all salespeople simultaneously.

Although the cost of the transceiver (or receiver)

Soon nearly all mobile computers will offer every type of wireless communications option by virtue of their PC Card slots.

**WITH 30,000 HOT PROSPECTS
ON THE LINE EVERY DAY**

**WHO DO YOU WANT
STANDING BEHIND YOUR
PHONE SYSTEM?**



As you read this, mail-order giant DAMARK International is moving 16 camcorders, 12 garage door openers, 8 motorized kiddie cars and now 6 more camcorders...but wait! We can't write this fast enough to keep up! Fortunately, Fujitsu's F9600™ telephone system can. Its unique non-blocking architecture instantly switches all calls through, at which point its ACD software routes these calls to "next available agent" to minimize wait time.

And no matter how fast DAMARK International grows – sales jumped from \$1.3 million in 1986 to \$214 million in 1991! – the F9600's modular 50- to 9600-line PBX grows seamlessly right along with it.

Best of all, the robust F9600 is ISDN-ready to ID future callers by their phone numbers so their files can be called up on-screen before the agent connects the line.

"Hi, Mr. Jones. How did you like those golf clubs?" replaces *"How can I help you?"*

To see how Fujitsu can help you, call 1-800-553-3263.



The F9600 Digital Telephone from Fujitsu, a \$25-billion global telecommunications leader serving over 100 countries.

FUJITSU

Computers, Communications, Microelectronics

FRONTLINE

and the ongoing charge for a wireless service appear high, both will be affected by the relentless decline in the cost of semiconductors. Transceivers or receivers (the part that attaches to or is built into the computer) will drop dramatically in size, weight and price over the next few years. Expect price declines of 20 to 40 percent per year for the next two to three years as the volume ramps up. Wireless datacom service prices will decline, although more slowly, as the fixed cost of each service is spread over more and more users and competition increases.

Each type of wireless communications has its ideal (and less than ideal) applications. For some applications, using more than one type may be appropriate (for example, cellular for the transmission of large blocks of information and ARDIS for the transmission of small message packets). The tradeoffs and options will make life interesting for information systems architects for decades to come.

Communicators to Come

GETTING PERSONAL

During the 1990s, mobile computers in myriad shapes and sizes will come with wireless communications built in and/or offer a family of options spanning the spectrum of wireless possibilities.

As an accessible mobile platform, Apple's Newton personal digital assistant has captured the computer world's attention. But Apple is not alone in its vision of ubiquitous communications-centric personal information

technology. Representative of leading-edge thinking in the mobile-computer spectrum are personal communicator product concepts recently announced by AT&T and GO Corp. Built from AT&T's communications-optimized microprocessor and GO's PenPoint operating system, personal communicators in the AT&T-GO vision include:

- **The Telephone/Notepad:**

A pen computer notepad that attaches to any wired telephone and features personal organizer functions as well as note-taking applications. Two people using Telephone/Notepads can share notes on both.

- **The Cellular Telephone/**

Computer/Fax: A pen computer with companion cellular telephone base. Acts as a full-featured computer complete with filing system and notepad. Can be used for E-mail, communicating with corporate databases and sending or receiving faxes.

- **The Letter-Sized Notebook Computer/Telephone:**

About the size of a pad of paper, the Notebook Computer/Telephone is a pen computer with built-in cellular phone for voice, data and fax communications.

- **The Flip-Phone:** A cellular phone with built-in pen computer running the full length of the phone. Can be used to communicate with desktop computers or company databases.

Soon nearly all mobile computers will offer every type of wireless communications option by virtue of their PC Card slots. PC Card, the standard developed by the Personal Computer Memory Card Industry Association (PCMCIA) for computer-expansion

cards, is the length and width of a credit card, only thicker. PC Cards are to mobile computers what the ISA bus was (and is) to desktop PCs, but with even wider utility. Since mobile computers won't usually have floppy disk drives, programs will be distributed on PC Cards; even some consumer electronics devices, such as cameras, will feature PC Card slots. Capabilities offered now (or soon) include modems, MANs, infrared and radio-frequency LANs and data-paging. Options available outside of communications include mass storage (for example, HP's new 1.3-inch Kittyhawk disk drive, SunDisk's flash mass storage), memory expansion and programs and interfaces to every type of gadget known.

Handhelds, notebooks, subnotebooks and other mobile computers of the future (starting now) are likely to offer one or two PC Card slots: PC Card Type I slots for memory expansion and PC Card Type II (or larger) slots for a wireless communications option. By 1996 I expect more than 9 million mobile computers with Type II or larger slots to be in use in the United States.

Because users may wish to use several communications options on a mobile computer despite a limited number of PC Card slots and a limited budget, we can all wish for The Universal Transceiver that will work with a variety of wireless datacom services. The Universal Transceiver may (before the end of the

century) be built from digital signal processors and programmed to interface to any (well, nearly any) type of network. It would greatly improve the value for price of wireless datacom capability.

Over the Horizon

A WIRELESS FUTURE?

The shift from stationary to mobile computing is giving birth to wireless data communications, but it will take time for wireless technology, applications and infrastructure to come of age. I recall five years of "the year of the LAN" before, sure enough, it was the year of the LAN. It will be the same with wireless.

Wireless datacom will not find its greatest value in replacing wires any more than horseless carriages found their greatest

value in replacing horses. Automobiles gave us freedom of movement and efficient, spontaneous, point-to-point movement of industrial-age goods. They also gave us suburbs, inner cities and a new kind of status symbol. Wireless-computing communicators will give us freedom of movement, efficient, spontaneous, point-to-point movement of information-age goods, and . . . ☐

Portia Isaacson is president of Dream IT Inc., headquartered in Colorado Springs, Colo., a consultancy, publisher and workshop producer dedicated to providing quality information to customers and creators of frontline IT.

Wireless datacom will not find its greatest value in replacing wires any more than horseless carriages found their greatest value in replacing horses.

Moving To UNIX? Stop Here First.

Join Computer Associates And
Hewlett-Packard At A Free Half-Day
Briefing For CIOs, IS Executives
And UNIX System Managers.

*"Shows how CA and HP
make downsizing to UNIX practical for
mission-critical applications."*

Bernard Guidon, GM, General Systems Div., Hewlett-Packard Co.

"An excellent source of answers."

Assistant Director, Grumman Data Systems

"Fantastic."

VP, Data Admin., Options Clearing Corp.

The experts agree: if your future includes UNIX, this seminar is a must. "Overcoming The Barriers Of Downsizing To UNIX" helps you avoid the pitfalls and migrate safely to open systems.

Topics discussed include: solutions to thirty challenges you'll face managing UNIX; security methods for distributed environments; case studies on downsizing mainframe database applications; powerful new systems administration solutions; and practical action plans for making it all work.

Don't miss this important educational opportunity.

Register today!

Albany, NY	8/20, 10/15, 11/19	New York	8/11, 10/6, 11/10
Albuquerque	9/8, 11/19	Oklahoma City	8/11, 10/22
Atlanta	8/20	Omaha	9/9
Austin	7/30, 8/25, 11/5	Orlando	8/19
Baltimore	9/17	Paramus	8/20, 10/6, 11/17
Baton Rouge	10/28	Phoenix	8/6, 9/1, 10/14, 11/12
Birmingham	9/22	Piscataway	9/15
Boise	8/12, 9/10, 10/20, 11/18	Pittsburgh	9/17
Boston	8/13, 10/8, 11/12	Portland	9/17, 11/24
Buffalo	8/26	Raleigh	9/10
Charlotte	9/16	Richmond	8/27
Chicago	8/27	Rochester	8/25, 10/20
Cincinnati	8/25, 10/20	Salt Lake City	8/5, 9/3, 10/13, 11/11
Cleveland	8/26, 10/21	San Francisco	7/24, 10/20
Columbia, SC	10/8	San Jose	10/6, 12/9
Columbus, OH	9/16	Seattle	8/13, 11/4
Dallas	7/28, 8/26, 10/8, 11/3	Shreveport	11/19
Denver	8/4, 9/2, 10/15, 11/10	Springfield, MO	10/6
Detroit	9/1	Stamford, CT	8/18, 10/13, 11/17
El Paso	8/13, 10/21	St. Louis	9/2, 10/15
Ft. Lauderdale	9/1	Syracuse	10/21
Ft. Wayne	9/8	Tallahassee	10/29
Grand Rapids	8/11	Tampa	9/23
Greenville, SC	9/15	Topeka	11/18
Houston	7/29, 8/27, 10/6, 11/4	Tulsa	9/9, 11/17
Indianapolis	9/3	Valley Forge	10/9, 11/18
Jackson, MS	10/1	Washington, DC:	
Jacksonville	11/11	(Falls Church, VA)	8/26, 9/24, 10/15, 11/19
Kansas City, MO	9/10, 10/14	(Rockville, MD)	8/20, 10/8, 11/12
Little Rock	11/12	Wichita	8/27
Los Angeles	9/4, 11/17		
Louisville	9/9	CANADA	
Madison, WI	9/2	Calgary	9/24
Memphis	9/30	Edmonton	9/28
Miami	10/7	Halifax	10/8
Milwaukee	9/3	Montreal	9/15
Minneapolis	8/26	Ottawa	9/17
Mobile	10/20	Regina	9/30
Nashville	9/16	Toronto	10/6, 11/17
New Orleans	9/24	Vancouver	9/22
		Winnipeg	10/2

To Register, FAX

This Form To

1-516-342-5734.

Or Call

Dana Williams

At 1-800-225-5224.

Name(s)

Company

Title(s)

Address

City

State

Zip

Phone Number(s)

Seminar Location

Date

☐ I Cannot Attend, But Please
Send Seminar Materials.

**COMPUTER
ASSOCIATES**
Software superior by design.



I N D E X

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

AT&T	14, 30
Adobe Systems	54
Aetna	46
Alacritty Systems Inc.	54
Amdahl Corp.	30
American Greetings Corp.	14
Apple	54, 60
Asset Group, The	26
L.L. Bean	14
Corporate Memory Systems Inc.	14
Dartmouth-Hitchcock Medical Cntr.	46
Diebold Inc.	14
Digital Equipment Corp.	30, 54
Dun & Bradstreet	14
EDS	26
Evernet Systems Inc.	26
FirstLine Trust	30
Fiserve Inc.	30
Geisinger Health Care System	46
GO Corp.	60
Greenmoss Builders	14
Group Technologies Inc.	14
HFC Bank Plc.	30
Hewlett-Packard	54, 60, 68
Home Insurance	30
Home Shopping Network Inc.	38
J.M. Huber Corp.	30
IBM	14, 30, 54, 68
InfoCorp	54
Insight Development Corp.	54
InterBold	14
Intermountain Health Care	46
JetFax Inc.	54
Kodak	54
LaserMaster Corp.	54
Logitech Inc.	14
Lotus Development Corp.	14
MCI	14
MapInfo Corp.	68
MarketPulse	14
Microsoft	54
Motorola	46, 60

NCR	60
NEC	54
National Academy Press	46
Novell Inc.	30, 38
Otis Elevator	60
PenPoint	60
Photonics	60
Pittsburgh National Bank	14
PostScript	54
Pyramid Technology Corp.	30
QMS Inc.	54
Reach Software Corp.	14
Russell Martin and Associates	14
Sears, Roebuck and Co.	14
SkyTel	60
Software AG of North America Inc.	30
Springer-Verlag New York Inc.	46
Tektronix Inc.	54
Travelers Companies, The	68
USConnect	26
Unisys	38
A.R. Wright	14
XLI Corp.	54
Xerox Corp.	54
Zimbrick Inc.	14

Advertiser Index

AT&T Technologies	34
Advanced Network Services	27
Andersen Consulting	C4
CIO Publishing Inc.	9, C3
Comdisco	2
ComNet	67
Computer Associates Intl. Inc.	4, 65
Data General Corp.	29
Digital Consulting Inc.	19
Digital Equipment Corp.	C2, 8A
Dun & Bradstreet Software	37
EDS	58
Early, Cloud & Co.	11
Everex Systems Inc.	53
Fujitsu Ltd.	63
GRiD Systems Corp.	61
Information Builders Inc.	51
Information Resources Inc.	17
Legent Corp.	6
NCR Corp.	20
New England Telephone (Regional)	26A
Open Connect Systems	23
Programart Corp.	15
Racal-Datcom Inc.	18A
Sprint	57
Stratus	42
Texas Instruments	12
Unisys Corp.	24
Xerox Corp.	55

Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-8200. **Postal Information:** CIO (ISSN 0894-9301) is published monthly; and semi-monthly in April, May, June, September, October and November by CIO Publishing Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1992 by CIO Publishing Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: \$. **Microfilm:** CIO issues and articles can be purchased on 16mm and 35mm microfilm and on 105mm microfiche through University Microfilms International, Serials Acquisitions Department, 300 N. Zeeb Road, Ann Arbor, Michigan 48106. **Subscriptions:** Address subscription inquiries to CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208 or call (800) 788-4605. CIO is distributed free of charge to qualified top information executives. To all others, the one-year basic rate for the U.S. and Canada is \$94. For rates to other countries, please write the publisher. The single copy price is \$7. All subscriptions payable in U.S. funds only. Please allow four to six weeks for new subscriptions to begin. **Change of Address:** Please allow four to six weeks for change of address to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

CIO Sales Offices

President and Publisher

JOSEPH L. LEVY
508 935-4601

Director of Marketing

CATHY O'LEARY HAYES
508 935-4521

List Services Manager

STEPHANIE LEGELIS
508 935-4433

Sales & Marketing Specialist

BRIDGET CAMMARATA
508 935-4035

CIO Publishing Inc.

492 Old Connecticut Path

PO Box 9208

Framingham, MA 01701-9208

508 872-8200, FAX 508 872-0618

NEW ENGLAND AND CENTRAL

Regional Director/Advertising Sales

LINDA L. BURTON

508 935-4039

CIO Publishing Inc.

492 Old Connecticut Path

PO Box 9208

Framingham, MA 01701-9208

508 872-8200, FAX 508 872-0618

EAST COAST

Regional Director/Advertising Sales

MICHAEL J. MASTERS

Regional Manager/Advertising Sales

FRANK S. GENOVESE

Advertising Sales Assistant

PATRICIA GABELMANN

CIO Publishing Inc.

30 Two Bridges Road, Suite 340

Fairfield, NJ 07004

201 227-1140, FAX 201 227-1565

MIDWEST/SOUTH

Regional Director/Advertising Sales

LINDA L. BURTON

Advertising Sales Assistant

CAROL LEE GOCKENBACH

CIO Publishing Inc.

10400 West Higgins Road, Suite 300

Rosemont, IL 60018

708 827-4515, FAX 708 827-9159

WEST COAST

Regional Director/Advertising Sales

GERALD E. PARSONS

Regional Manager/Advertising Sales

RICHARD BASTAS

Advertising Sales Associate

JAY LAMPUS

CIO Publishing Inc.

220 Montgomery Street, Suite 1120

San Francisco, CA 94104

415 398-8200, FAX 415 398-4649

CIO is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 181 computer publications in 58 countries. Thirty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA'S** Computerworld Argentina, Infoworld Argentina; **ASIA'S** Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia, PC World Malaysia; **AUSTRALIA'S** Computerworld Australia, Australian PC World, Australian Macworld, Profit, Information Decisions, Reseller; **AUSTRIA'S** Computerwelt Oesterreich; **BRAZIL'S** DataNews, Mundo IBM, Mundo Unix, PC Mundo, Publish; **BULGARIA'S** Computerworld Bulgaria, Ediworld, PC World Express; **CANADA'S** Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; **CHILE'S** Computerworld, Informatica; **COLOMBIA'S** Computerworld Colombia; **CZECHOSLOVAKIA'S** Computerworld Czechoslovakia, PC World Czechoslovakia; **DENMARK'S** CAD/CAM WORLD, Communications World, Computerworld Danmark, Computerworld Focus, Computerworld Uddannelse, LAN World, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC World Produktguide, Windows World; **ECUADOR'S** PC World; **EGYPT'S** PC World Middle East; **FINLAND'S** Mikro PC, Tietoviikko, Tietoverkko; **FRANCE'S** Computer Direct, Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux International; **GERMANY'S** Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, edv aspekte, Information Management, Lotus Welt, Macwelt, Netzwelt, PC Welt, PC Woche, Publish, Unit, Unix Welt; **GREECE'S** Infoworld, PC Games, PC World Greece; **HUNGARY'S** Computerworld SZT, Mikrovilag Magazin, PC World; **INDIA'S** Computers & Communications; **ISRAEL'S** Computerworld Israel, PC World Israel; **ITALY'S** Computerworld Italia, Macworld Italia, Networking Italia, PC World Italia; **JAPAN'S** Computerworld Japan, Macworld Japan, SunWorld Japan; **KENYA'S** East African Computer News; **KOREA'S** Computerworld Korea, Macworld Korea, PC World Korea; **MEXICO'S** Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; **THE NETHERLANDS'** Computer! Totaal, Computerworld Netherlands, LAN Magazine, MacWorld; **NEW ZEALAND'S** Computer Listings, Computerworld New Zealand, New Zealand PC World; **NIGERIA'S** PC World Africa; **NORWAY'S** Computerworld Norge, C/world, Lotusworld Norge, Macworld Norge, Networld, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Guiden, Unix World, Windowsworld; **IDG Direct Response;** **PERU'S** PC World; **PEOPLE'S REPUBLIC OF CHINA'S** China Computerworld, PC World China, Electronics International; **IDG HIGH TECH** New Product World, Consumer Electronics New Product World; **PHILIPPINES'** Computerworld, PC World; **POLAND'S** Computerworld Poland; **ROMANIA'S** Infocub Magazine; **RUSSIA'S** Computerworld-Moscow, PC World, Networks; **SPAIN'S** Amiga World, Autoedicion, CIMWorld, Computerworld Espana, Comunicaciones World, Macworld Espana, PC World Espana, Publish; **SWEDEN'S** Affarsekonomi Management, Attack, CAD/CAM World, ComputerSweden, Corporate Computing, Digital Varlden, Lokala Natverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World, Publishing & Design (CAP), Unix/Opna system, Datalingenjoren, Maxi Data/Windows; **SWITZERLAND'S** Computerworld Schweiz, Macworld Schweiz, PC & Workstation; **TAIWAN'S** Computerworld Taiwan, PC World Taiwan; **THAILAND'S** Thai Computerworld; **TURKEY'S** Computerworld Monitor, Macworld Turkiye, PC World Turkiye; **UNITED KINGDOM'S** Lotus Magazine, Macworld, **UNITED STATES'** AmigaWorld, Cable in the Classroom, CIO, Computer Buying World, Computerworld, Digital News, DOS Resource Guide, Electronic News, Federal Computer Week, GamePro, inCider/A+, IDG Books, InfoWorld, LOTUS, Macworld, MPC World, Network World, NeXTWORLD, PC Games, PC World, PC Letter, Publish, RUN, SunWorld, SWATPro; **VENEZUELA'S** Computerworld Venezuela, MicroComputerworld Venezuela, **YUGOSLAVIA'S** Moj Mikro



MIGRATION

COMNET KEEPS YOUR NETWORK MOVING IN THE SAME DIRECTION AS YOUR BUSINESS NEEDS



At ComNet, we know your network has to do more than just serve as a showcase for "gee-whiz" technologies. It has to meet the specific needs of your organization and provide reliable, easy-to-use performance.

That's why we help you sort through the maze of current and next-generation networking options, to arrive at manageable solutions for growth. For example, the Executive Symposium at ComNet '93 will discuss the amortization of existing infrastructure vs. new technology investments, with an overview of how successful Fortune 2000 companies are re-engineering their networks.

The ComNet Conference will provide insight on carrier options for outsourcing, managing bandwidth, and the new generation of LAN management solutions, to name just a few. You'll understand the latest technologies and learn how to avoid costly mistakes.

For product evaluation, nothing beats the ComNet show floor, where over 450 companies will be on hand for ComNet '93. This is the place to sample new products at the beginning of the year (while they're still new) and look at the latest offerings from every leading manufacturer in networking and communications.

Want more? Just drop us a line and we'll send you complete information and a FREE exhibits pass for ComNet '93. Once you see what's in store at ComNet '93, you won't want to fly anywhere else next winter.

LIVENET

EXPERIENCE LEADING EDGE TECHNOLOGIES IN HIGH PERFORMANCE ENTERPRISE NETWORKING.

FEBRUARY

1-4, 1993

WASHINGTON, D.C.

GET FREE ADMISSION TO OVER 450 EXHIBITING COMPANIES PLUS DETAILED INFORMATION ON ISSUES AND SOLUTIONS AT THE COMNET CONFERENCE, FEBRUARY 1-4, 1993, WASHINGTON D.C.

M1

NAME/TITLE _____

COMPANY _____

ADDRESS _____

CITY/STATE/ZIP _____

MAIL TO: COMNET '93, P.O. BOX 9107, FRAMINGHAM, MA 01701-9107

PHONE: 800-225-4698 OR FAX TO: 508-872-8237.

Is There a Doctor Near the House?

Mapping technology is helping The Travelers insurance company sell its managed-care network to employers and improve customer service

Mention mapping technology to most people and you're likely to conjure up thoughts of oil companies looking for elusive strikes or paper companies tracking dwindling resources. Over the past year, however, The Travelers Companies, headquartered in Hartford, Conn., has proved that such technology can be used effectively to bolster customer service and drum up new business.

The Travelers' Managed Care and Employee Benefits Operations (MCEBO) maintains a nationwide health-care network of 70,000 physicians, 1,000 hospitals, 2,000 ancillary providers and more than one million customer employees and their dependents. When Vice President Alvin Decker thought that the network could be enhanced—and customer service improved—by visually conveying the information contained in centralized databases, the company turned to mapping technology.

Last summer Travelers began using MapInfo, a desktop mapping software package from MapInfo Corp. of Troy, N.Y. DOS versions of the package run on IBM PS/270s and '486 machines in five MCEBO regional offices throughout the country, with a Windows

version at headquarters. Each MapInfo-equipped PC is linked to the central IBM mainframe host in the company's data center in Norcross, Ga., which contains provider data. Local Hewlett-Packard laser-jet color printers output the maps at each location. Currently, a staff of about 10 people scattered throughout the various locations is responsible for creating maps requested by sales personnel.

"In the beginning we only wanted to have a visual presentation of the managed-care network by showing the location of providers," said William Rohrer, director of technology products for MCEBO. "Because the software is flexible, we now create maps showing providers, employers and employees. We also do detailed analysis and distance reporting."

Gone are the days of paper maps and primary-colored push pins. Today a sales representative contacts the regional mapping expert with a new customer proposal. Typically, the map creator will be given the home addresses or zip codes of the prospective customer's employees. A quick report is generated on the host in Norcross to determine where the employees fall in the network of managed-care sites. The sales representative can then select the best criteria for creating a

customized proposal.

For example, a map can be created showing an employer that 35 primary-care physicians are located within a 10-mile radius of a particular employee. Customized maps and reports can be created using a variety of criteria, such as proximity or type of medical services. Usually about six maps are created for each sales proposal.

The result, according to Rohrer, is an improvement in new-site planning and marketing efforts. "Mapping definitely helps employers evaluate the competitive position of The Travelers," he said. "We also can see where we have gaps in services and add providers to the network."

Standard maps bearing The Travelers' logo are used in sales presentations for a variety of particular situations; these have helped the sales staff achieve an improved ratio of sales per proposal. The technology has proved so versatile that Rohrer hopes to develop additional demographics applications. Currently, analysis is centered around the home addresses of employees. Rohrer wants to be able to look at claim history to see where people are actually going for services. Eventually, he would also like to provide online access to individual employees so they can make their own inquiries.

—Megan Santosus

VITAL STATISTICS

Organization: The Travelers Insurance Cos., Hartford, Conn.

Application: Mapping and managed-care network analysis

Technologies: Desktop mapping software running on IBM PS/270s and '486s, connected to an IBM central mainframe and HP laser-jet color printers.

Scope: Managed Care and Employee Benefits Operations division

Sponsor: Alvin Decker, vice president of new business marketing

Objective: To enhance the managed-care network and improve customer service

Payoff: Improves new-site planning and sales presentations

[illegible]

Walter Manninen at (508) 935-4101. ■



Framingham, MA 01701



Give your customers what they want... ...even if they ask for the moon.

DCS/Logistics® software: the launching pad to a new world of customer service.

What are your customers asking for today? More importantly, what will they expect tomorrow?

Shelf-ready shipping. Order consolidation. Invoicing options. Instant information. Hundreds of customers may pressure you to do business in hundreds of unique ways. With DCS/Logistics distribution management software you can respond faster—and more profitably—to demanding requests. Anywhere in the world.

Capabilities like EDI, bar code scanning, multi-language and multi-currency, order processing, DRP/replenishment, pricing and promotions, inventory and warehouse management, and shipment planning let you build strong, strategic relationships with your customers.

As an open systems solution with a client server architecture and relational database, DCS/Logistics is technically lightyears ahead.

Fully scalable versions are available for IBM® and Digital VAX™ platforms.

When your customers ask for the moon, promise it to them. With confidence. Call Andersen Consulting at (800) 541-7512 or (312) 507-6588.

**ANDERSEN
CONSULTING**
Software Products